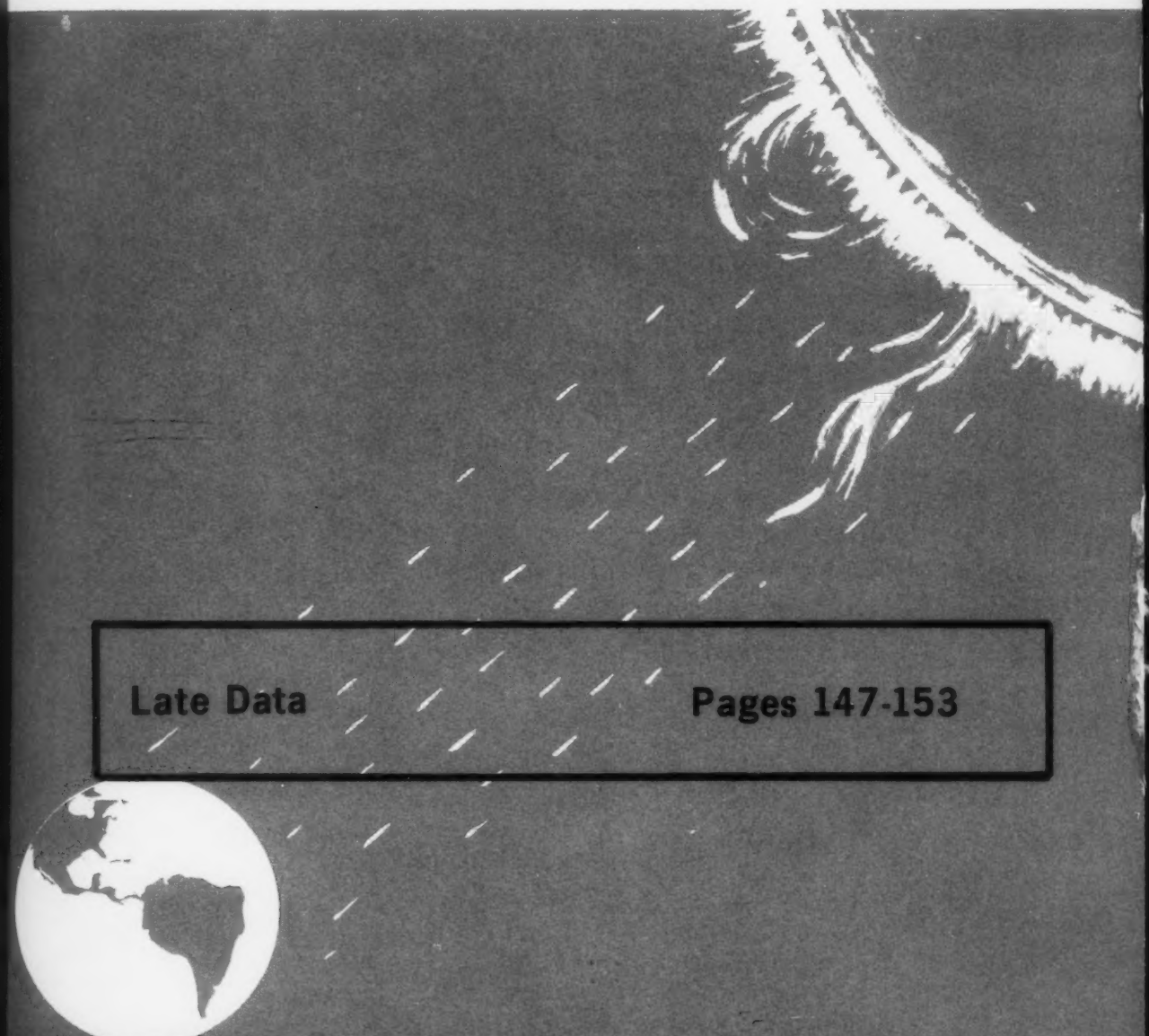
FEBRUARY 1982 NUMBER 450 -- Part I

Solar-Geophysical Data prompt reports

Data for January 1982, December 1981 & Late Data
Explanation of Data Reports Issued as Number 450 (Supplement) February 1982



Late Data **Pages 147-153**

noaa NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION / ENVIRONMENTAL DATA AND INFORMATION SERVICE / BOULDER, COLORADO

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Solar - Geophysical Data

NO. 450 FEBRUARY 1982

Part I (Prompt Reports)

DATA FOR
JANUARY 1982
DECEMBER 1981

NATIONAL GEOPHYSICAL AND SOLAR - TERRESTRIAL DATA CENTER
BOULDER, COLORADO

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SOLAR-GEOPHYSICAL DATA

No. 450

Issued in two parts

Helen E. Coffey, Editor

Joe H. Allen, Chief
Solar-Terrestrial Physics Division

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A.8ac	2800 MHz - Daily Values of Adj. Solar Flux (ARO-Ottawa)	438A 11	439A 9	440A 11	441A 13	442A 11	443A 9	444A 11	445A 11	446A 11	447A 11	448A 11	449A 11	450A 11
A.8g	Daily Values of Adjusted Solar Flux (AFGL)	438A 11	439A 9	440A 11	441A 13	442A 11	443A 9	444A 11	445A 11	---	447A 11	448A 11	449A 11	450A 11
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A.10d	43 cm East-West Solar Scans (Fleurs)	438A 25	439A 23	440A 33	441A 34	442A 31	443A 27	444A 31	445A 31	446A 24	447A 33	448A 29	449A 29	450A 27
A.10e	10.7 cm East-West Solar Scans (Ottawa-ARO)	438A 23	439A 26	440A 31	441A 32	442A 29	443A 25	444A 29	445A 29	446A 22	447A 31	448A 27	449A 27	450A 25
A.10f	3 cm East-West Solar Scans (Toyokawa)	438A 22	439A 25	440A 30	441A 31	442A 28	443A 24	444A 28	445A 30	---	447A 29	448A 26	449A 26	450A 24
A.10g	8 cm East-West Solar Scans (Toyokawa)									446A 21	447A 30	---	---	---
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A.17c	Inferred IP Magnetic Field	438A 34	439A 36	440A 44	441A 48	442A 42	443A 36	444A 44	445A 46	446A 32	447A 44	448A 42	449A 36	450A 32
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B.53	Quality Figures Based on Frequency Ranges	439A152	440A156	443A166	442A158	443A149	444A150	445A165	446A139	447A158	448A156	449A166	450A143	
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C.1a	Optical Observations Flares	438A 16	439A 14	440A 18	441A 18	442A 16	443A 15	444A 16	445A 16	446A 16	447A 16	448A 16	449A 16	450A 16
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C.1d	Flare Patrol Observations 1979-80	445B 90	446B 42	449B 95										
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C.4e	Solar Radio Spectral Obs. (Weissenau)	440A126	441A136	442A134	443A123	445A174	445A136	445A136	446A108	447A130	448A173	449A132	450A122	
C.4f	Solar Radio Spectral Obs. (Sagamore Hill)	439A128	440A126	441A136	442A134	443A123	444A127	445A136	445A108	447A130	448A134	449A132	450A122	
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D.1ba	27-day Chart of Kp Indices	439A147	440A151	441A164	442A153	443A146	444A146	445A162	446A137	447A154	448A152	449A161	450A140	
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D.1ca	aa graph 1868 - present													
D.1d	Principal Magnetic Storms	439A148	440A152	441A166	442A155	443A147	444A147	445A163	447A180	448A164	449A186	449A162	450A141	
D.1e	Reduced Magnetograms													
D.1f	Sudden Commencement and Solar Flare Effects	439A149	441A170	442A180	443A165	443A148	445A180	445A164	446A138	447A155	448A153	449A163	450A142	
D.1g	Equatorial Indices Dst	440A160	441A172	442A182	444A155	445A192	445A183	446A144	447A179	448A163	449A185	450A153		
D.1h	Geomagnetic Substorm Log (Boulder)	438A 38	439A 40	440A 43	441A 51	442A 46	443A 40	444A 48	445A 4	446A 35	447A 47	448A 45	449A 39	450A 35
F.	COSMIC RAYS													
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F.1b	Cosmic Ray Neutron Counts (Climax)		440A159	442A177	442A151	443A141	445A178	447A176	447A177	447A151	449A180	450A149		
F.1e	Cosmic Ray Neutron Counts (Alert)	440A159	440A145	442A177	442A151	444A152	447A176	447A176	447A177	447A151	449A180	450A149	450A134	
F.1h	Cosmic Ray Neutron Counts (Thule)	439A144	440A145	441A159	442A151	443A141	444A141	445A157	446A134	447A151	449A149	449A158	450A134	
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H.60	IUWDS Alert Decisions	438A 5	439A 4	440A 5	441A 5	442A 5	443A 5	444A 5	445A 5	446A 4	447A 4	448A 4	449A 5	450A 5

Notes:

"439A 46" listed under 1981 Jan means that the sunspot drawings for Jan 1981 were contained in *Solar-Geophysical Data* Number 439 - Part I, beginning on page 46.

A = Part I, B = Part II.

----- = no data available.
blank = data not yet received.

SGD 450 Part I (Prompt)

JANUARY 1982 DATA

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ALERT PERIODS

INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

JANUARY 1982

PRESTO MESSAGES (THE RAPID REPORT OF MAJOR EVENTS)

03 JANUARY 1982 TOYOKAWA 03/0125Z TENFLARE 160 FLUX UNITS 02/0607Z
13 JANUARY 1982 TOYOKAWA 13/0407Z TENFLARE 190 FLUX UNITS 13/0126Z DURATION 21 MINUTES
22 JANUARY 1982 TOYAKAWA 22/0525Z TENFLARE 460 FLUX UNITS 22/0412Z DURATION 12 MINUTES
24 JANUARY 1982 TOYOKAWA 24/0210Z TENFLARE 130 FLUX UNITS 24/0152Z DURATION 12 MINUTES
27 JANUARY 1982 BOULDER 27/2154Z SOFLARE M1/2B S13E61 27/2110Z DURATION 9 MINUTES
28 JANUARY 1982 KISLOVODSK 28/1437Z MAJOR FLARE 6100 and 15000 MHZ RADIO BURST 505 and 830 FLUX UNITS RESPECTIVELY START 28/0640Z END 0830Z.
28 JANUARY 1982 TOYOKAWA 28/0827Z TENFLARE 630 FLUX UNITS 28/0640Z OBSERVED UNTIL 0802Z
28 JANUARY 1982 BOULDER 28/1417Z SOFLARE M8/3B N09E45 28/0656Z DURATION 39 MINUTES
28 JANUARY 1982 BOULDER 28/1417Z TENFLARE 320 FLUX UNITS 28/0701Z DURATION 45 MINUTES
28 JANUARY 1982 CULGOORA 28/0950Z SOFLARE 3B N12E45 28/0702Z MAX 0715Z END 0755Z UMBRAL COVERAGE RADIO TYPE II AND IV.
28 JANUARY 1982 LEARMONTH 28/0950Z SOFLARE 3B REGION 3573 UMBRAL COVERAGE PARALLEL RIBBONS RADIO II-IV.
28 January 1982 BOULDER 28/1820Z SOFLARE M1/2B S15E49 29/1546Z DURATION 132 MINUTES
30 JANUARY 1982 SYDNEY 30/2351Z SOFLARE CULGOORA 2B FLARE REGION 3576 S16E13 START 2325Z MAXIMUM 2339Z
31 JANUARY 1982 TOYOKAWA 31/0044Z TENFLARE 1200 FLUX UNITS 30/2333Z DURATION 65 MINUTES
31 JANUARY 1982 BOULDER 31/0230Z SOFLARE X1/3B S15E12 30/2330Z DURATION 38 MINUTES
31 JANUARY 1982 BOULDER 31/0230Z TENFLARE 720 FLUX UNITS 30/2327Z DURATION 65 MINUTES
31 JANUARY 1982 BOULDER 31/1700Z PROTON EVENT 31/1630Z WITH 800 PROTONS GREATER THAN 10 MEV

STRATWARM ALERT January 1982

STRATWARM ALERT/WEDNESDAY/ STRATWARM EXIST. STRONG ANTICYCLONES AND MODERATE WARMING IN MID STRATOSPHERE OVER NORTH ATLANTIC AND PACIFIC OCEANS SPREADING POLEWARD. WARM AIR OVER POLAR REGION IN UPPER STRATOSPHERE.

STRATWARM ALERT/THURSDAY/ STRATWARM EXISTS. STRONG ANTICYCLONES AND MODERATE WARMING IN MID STRATOSPHERE OVER NORTH ATLANTIC AND PACIFIC OCEANS CONTINUE SPREADING POLEWARD.

STRATWARM ALERT/MONDAY/ STRATWARM EXISTS. TEMPERATURE GRADIENT REVERSED BETWEEN POLE AND 60 N ABOVE 30 KM AND CIRCULATION REVERSED ABOVE 45 KM.

STRATWARM ALERT/TUESDAY/ STRATWARM EXISTS. STRONG THERMAL RIDGING ACROSS POLE ABOVE 30 KM CIRCULATION REVERSAL ABOVE 45 KM CONTINUES.

STRATWARM ALERT/WEDNESDAY/ STRATWARM EXISTS. WARM AIR CONTINUES TO DOMINATE MID TO UPPER STRATOSPHERE NEAR POLAR REGIONS AND CIRCULATION REVERSAL CONTINUES IN UPPER STRATOSPHERE.

STRATWARM ALERT/THURSDAY/STRATWARM EXISTS. WARM AIR CONTINUES OVER POLAR REGION. POLAR CIRCULATION IS REVERSED ABOVE 45 KM.

STRATWARM ALERT/FRIDAY/ STRATWARM EXISTS. WARMING CONTINUED OVER ARCTIC REGION. POLAR CIRCULATION REVERSED ABOVE 40 KM.

ALERT PERIODS

INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

JANUARY 1982

SUMMARY OF THE GEOALERT WWA MESSAGES

Message serial number	Date of issue	Date of observation	Wolf number	10 cm solar flux	A index	Active Regions				Outstanding events	Forecasts			Alert Situations
						Location Lat-Long	No of Flares Total	M	X		Date	Location Lat-Long	Desc*	
001	01	31	178	187	020	S21W82	0	0	0		01	S21W82	Q	SOLQUIET
						N20W73	1	0	0			N20W73	E	MAGQUIET
						S18W63	0	0	0			S18W63	Q	
						S24W61	0	0	0			S24W61	E	
						S09W55	0	0	0			S09W55	Q	
						S19W50	0	0	0			S19W50	Q	
						N18W18	0	0	0			N18W18	E	
						S10W10	0	0	0			S10W10	Q	
						N06E14	0	0	0			N06E14	Q	
						N25E30	0	0	0			N25E30	Q	
						N10E54	0	0	0			N10E54	Q	
						S15E72	0	0	0			S15E72	Q	
002	02	01	161	186	009	S22W96	0	0	0		02	S22W96	Q	SOLQUIET
						N20W88	2	1	0			N20W88	Q	MAGQUIET
						S18W78	0	0	0			S18W78	Q	
						S24W74	0	0	0			S24W74	Q	
						N18W31	0	0	0			N18W31	Q	
						S10W23	0	0	0			S10W23	Q	
						N23E18	7	0	0			N23E18	Q	
						N07E03	0	0	0			N07E03	Q	
						N22E29	3	0	0			N22E29	Q	
						N10E41	0	0	0			N10E41	Q	
						S15E59	0	0	0			S15E59	Q	
003	03	02	171	183	009	N20W88	1	1	0	Presto Tenflare	03	N20W88	Q	SOLQUIET
						S17W86	0	0	0	160 Flux Units		S17W86	Q	MAGQUIET
						S26W85	0	0	0	02/0607Z		S26W85	Q	
						N18W44	0	0	0			N18W44	Q	
						S11W34	0	0	0			S11W34	Q	
						N07W10	0	0	0			N07W10	Q	
						N26E05	4	0	0			N26E05	Q	
						N23E16	0	0	0			N23E16	Q	
						N11E29	1	0	0			N11E29	Q	
						S13E46	0	0	0			S13E46	Q	
						S15E56	0	0	0			S15E56	Q	
						S33E75	1	0	0			S33E75	Q	
						S14E76	0	0	0			S14E76	Q	
004	04	03	166	182	016	N19W59	0	0	0		04	N19W59	Q	SOLQUIET
						N26W10	1	0	0			N26W10	Q	MAGQUIET
						N22E03	0	0	0			N22E03	Q	
						N10E07	3	0	0			N10E07	Q	
						N10E17	0	0	0			N10E17	Q	
						S14E31	0	0	0			S14E31	Q	
						S17E43	0	0	0			S17E43	Q	
						N08E49	0	0	0			N08E49	Q	
						S36E60	5	0	0			S36E60	Q	
						S16E64	0	0	0			S16E64	Q	
005	05	04	174	176	008	N18W72	0	0	0		05	N18W72	Q	SOLQUIET
						N26W22	2	0	0			N26W22	Q	MAGQUIET
						N21W10	0	0	0			N21W10	Q	
						N10W07	10	0	0			N10W07	Q	
						N22W03	0	0	0			N22W03	Q	
						N11E05	0	0	0			N11E05	Q	
						S15E19	0	0	0			S15E19	Q	
						S17E30	0	0	0			S17E30	Q	
						S36E48	0	0	0			S36E48	Q	
						S16E51	0	0	0			S16E51	Q	
						S06E64	0	0	0			S06E64	Q	
006	06	05	137	171	006	N18W87	0	0	0		06	N18W87	Q	SOLQUIET
						N26W36	1	0	0			N26W36	Q	MAGQUIET
						N21W25	0	0	0			N21W25	Q	
						N10W20	0	0	0			N10W20	E	
						S16E05	0	0	0			S16E05	Q	
						S17E16	0	0	0			S17E16	Q	
						S36E36	1	0	0			S36E36	Q	
						S16E38	0	0	0			S16E38	Q	
						S06E51	0	0	0			S06E51	Q	
007	07	06	115	173	010	N26W49	0	0	0		07	N26W49	Q	SOLQUIET
						N10W35	6	0	0			N10W35	E	MAGQUIET
						S17E03	0	0	0			S17E03	Q	
						S36E23	1	0	0			S36E23	Q	
						S16E25	0	0	0			S16E25	Q	
						S06E37	0	0	0			S06E37	Q	
008	08	07	131	178	010	N08W49	6	0	0		08	N08W49	E	SOLQUIET
						S17W12	1	0	0			S17W12	Q	MAGQUIET
						N10W04	0	0	0			N10W04	Q	
						S16W00	0	0	0			S16W00	Q	
						S36E10	1	0	0			S36E10	Q	
						S16E12	0	0	0			S16E12	Q	
						S05E24	0	0	0			S05E24	Q	
009	09	08	182	162	006	N09W63	7	1	0		09	N09W63	E	SOLQUIET
						S18W27	1	0	0			S18W27	Q	MAGQUIET

ALERT PERIODS

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Message serial number	Date of issue	Date of observation	Wolf number	10 cm solar flux	A index	Active Regions				Outstanding events	Forecasts			Alert Situations
						Location Lat-Long	No. of Flares Total	M	X		Date	Location Lat-Long	Desc*	
						N09W17	0	0	0			N09W17	Q	
						S16W14	0	0	0			S16W14	Q	
						S36W02	0	0	0			S35W02	Q	
						S16W00	0	0	0			S16W00	Q	
						S07E12	0	0	0			S07E12	Q	
						S16E44	0	0	0			S16E44	Q	
						S07E48	0	0	0			S07E48		
010	10	09	173	170	003	N09W78	8	1	0		10	N09W78	A	SOLQUIET
						N22W71	1	0	0			N22W71	Q	MAGQUIET
						S17W41	0	0	0			S17W41	Q	
						N09W31	0	0	0			N09W31	Q	
						S16W28	1	0	0			S16W28	E	
						S36W16	1	0	0			S36W16	Q	
						S16W15	0	0	0			S16W15	Q	
						S34W05	0	0	0			S34W05	Q	
						S06W02	0	0	0			S06W02	Q	
						S21E01	0	0	0			S21E01	Q	
						S08E34	1	0	0			S08E34	Q	
011	11	10	141	151	003	N08W88	2	0	0		11	N08W88	E	SOLQUIET
						N23W82	0	0	0			N23W82	Q	MAGQUIET
						S17W54	0	0	0			S17W54	Q	
						S17W41	5	0	0			S17W41	Q	
						S36W28	1	0	0			S36W28	Q	
						S16W27	0	0	0			S16W27	Q	
						S35W17	0	0	0			S35W17	Q	
						S21W12	0	0	0			S21W12	Q	
						S17E19	0	0	0			S17E19	Q	
						S09E22	0	0	0			S09E22	Q	
012	12	11	069	141	004	S16W56	4	0	0		12	S16W56	E	SOLQUIET
						S15W40	0	0	0			S15W40	Q	MAGQUIET
						S36W40	0	0	0			S36W40	Q	
						S15E08	0	0	0			S15E08	Q	
						S07E64	0	0	0			S07E64		
013	13	12	075	137	003	S17W69	0	0	0		13	S17W69	E	SOLQUIET
						S36W54	1	0	0			S36W54	Q	MAGQUIET
						S16W53	0	0	0			S16W53	Q	
						S14W05	0	0	0			S14W05	Q	
						S08E52	3	0	0			S08E52	E	
014	14	13	074	132	005	S17W81	2	1	0	Presto Tenflare	14	S17W81	E	SOLQUIET
						S36W66	0	0	0	190 Flux Units		S36W66	Q	MAGQUIET
						S15W65	0	0	0	13/0126Z Duration		S15W65	Q	
						S08E39	3	0	0	21 Minutes		S08E39	E	
015	15	14	121	135	005	S17W92	0	0	0		15	S17W92	Q	SOLQUIET
						S16W79	0	0	0			S16W79	E	MAGQUIET
						S36W78	0	0	0			S36W78	Q	
						N04E14	5	0	0			N04E14	Q	
						S08E25	2	0	0			S08E25	E	
						S09E43	0	0	0			S09E43	Q	
						N11E77	0	0	0			N11E77	Q	
016	16	15	135	141	012	S15W92	0	0	0		16	S15W92	Q	SOLQUIET
						S09W14	0	0	0			S09W14	Q	MAGQUIET
						N04W00	7	0	0			N04W00	E	
						S09E12	3	0	0			S09E12	E	
						S09E28	0	0	0			S09E28	Q	
						N11E65	0	0	0			N11E65	Q	
017	17	16	158	152	014	S08W27	0	0	0		17	S08W27	Q	SOLQUIET
						N02W14	7	0	0			N02W14	E	MAGQUIET
						S15W14	0	0	0			S15W14	Q	
						N26W12	0	0	0			N26W12	Q	
						S10W01	5	0	0			S10W01	E	
						S10E15	0	0	0			S10E15	Q	
						N07E45	0	0	0			N07E45	Q	
						N10E52	0	0	0			N10E52	Q	
						N05E76	0	0	0			N05E76	Q	
018	18	17	178	158	012	S09W38	5	0	0		18	S09W38	E	SOLQUIET
						S20W33	0	0	0			S20W33	Q	MAGQUIET
						N02W28	2	0	0			N02W28	Q	
						S15W28	0	0	0			S15W28	Q	
						S11W14	5	0	0			S11W14	E	
						S14W04	0	0	0			S14W04	Q	
						S11W00	0	0	0			S11W00	Q	
						N06E30	0	0	0			N06E30	Q	
						N10E39	0	0	0			N10E39	Q	
						S15E48	0	0	0			S15E48	Q	
						N04E62	0	0	0			N04E62	Q	
019	19	18	199	173	009	S18W48	0	0	0		19	S18W48	Q	SOLQUIET
						S08W51	3	0	0			S08W51	E	MAGQUIET
						N02W41	0	0	0			N02W41	E	
						S15W41	0	0	0			S15W41	Q	
						S10W28	3	0	0			S10W28	E	

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SUMMARY OF THE GEOALERT WWA MESSAGES

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						S15W16	4	0	0			S15W16	E	
						S11W14	0	0	0			S11W14	Q	
						N07E16	0	0	0			N07E16	Q	
						N10E35	0	0	0			N10E35	Q	
						N05E49	0	0	0			N05E49	Q	
						N06E54	0	0	0			N06E54	Q	
						S24E67	0	0	0			S24E67	Q	
020	20	19	234	175	004	S07W66	0	0	0		20	S07W66	E	SOLQUIET
						S15W58	0	0	0			S15W58	Q	MAGQUIET
						N04W53	0	0	0			N04W53	E	STRATWARM
						N06W42	0	0	0			N06W42	Q	
						S10W41	0	0	0			S10W41	E	
						S14W30	0	0	0			S14W30	E	
						N31W06	0	0	0			N31W06	Q	
						N08E05	0	0	0			N08E05	Q	
						N10E13	0	0	0			N10E13	Q	
						S21E24	0	0	0			S21E24	Q	
						N04E33	0	0	0			N04E33	Q	
						S06E36	0	0	0			S06E36	Q	
						S12E43	0	0	0			S12E43	Q	
						S24E54	0	0	0			S24E54	Q	
021	21	20	181	173	007	S07W81	0	0	0		21	S07W81	E	SOLQUIET
						N04W67	0	0	0			N04W67	E	MAGQUIET
						S15W62	0	0	0			S15W62	Q	STRATWARM
						N06W58	0	0	0			N06W58	E	
						S10W55	1	0	0			S10W55	A	
						S15W43	0	0	0			S15W43	E	
						N31W21	0	0	0			N31W21	Q	
						N08W10	0	0	0			N08W10	Q	
						N10W01	0	0	0			N10W01	Q	
						S01E20	1	0	0			S01E20	E	
						S07E22	0	0	0			S07E22	Q	
						N25E41	0	0	0			N25E41	Q	
022	22	21	217	169	013	S08W91	0	0	0		22	S08W91	Q	SOLQUIET
						N03W82	0	0	0			N03W82	Q	MAGQUIET
						S11W82	0	0	0			S11W82	E	
						N05W70	0	0	0			N05W70	Q	
						S15W56	0	0	0			S15W56	Q	
						N30W35	0	0	0			N30W35	Q	
						N07W23	0	0	0			N07W23	Q	
						N12W19	0	0	0			N12W19	Q	
						N09W14	0	0	0			N09W14	Q	
						S23W01	0	0	0			S23W01	Q	
						S02E07	1	0	0			S02E07	Q	
						S08E08	6	0	0			S08E08	Q	
						S25E28	0	0	0			S25E28	Q	
						S08E51	4	0	0			S08E51	Q	
023	23	22	145	158	021	N03W94	2	1	0	Presto Tenflare	23	N03W94	Q	SOLQUIET
						N05W85	0	0	0	460 Flux Units		N05W85	Q	MAGALERT MINOR 23
						S12W79	1	0	0	22/0412Z Duration		S12W79	Q	STRATWARM
						N29W48	0	0	0	12 Minutes		N29W48	Q	
						N12W36	1	0	0			N12W36	Q	
						N11W27	1	0	0			N11W27	Q	
						N04W07	0	0	0			N04W07	Q	
						S01W06	0	0	0			S01W06	Q	
						S05W06	0	0	0			S05W06	Q	
						S25E14	0	0	0			S25E14	Q	
						S07E35	1	0	0			S07E35	Q	
024	24	23	112	153	017	N28W64	0	0	0		24	N28W64	Q	SOLQUIET
						N13W47	0	0	0			N13W47	Q	MAGALERT MINOR 24
						N09W41	0	0	0			N09W41	Q	
						S01W22	0	0	0			S01W22	Q	
						N05W20	1	0	0			N05W20	Q	
						S06W20	0	0	0			S06W20	Q	
						S07E24	0	0	0			S07E24	Q	
025	25	24	151	154	018	N31W74	0	0	0	Presto Tenflare	25	N31W74	Q	SOLALERT
						N12W66	1	0	0	130 Flux Units		N12W66	Q	MAGNIL
						N09W54	0	0	0	24/0152Z Duration		N09W54	Q	
						S01W39	1	0	0	12 Minutes		S01W39	Q	
						N04W34	5	0	0			N04W34	Q	
						S07W32	0	0	0			S07W32	Q	
						S08W15	0	0	0			S08W15	Q	
						S08E10	0	0	0			S08E10	E	
						N20E38	1	0	0			N20E38	Q	
						N19E66	1	0	0			N19E66	Q	
						N10E77	0	0	0			N10E77	Q	
026	26	25	132	177	008	N12W78	0	0	0		26	N12W78	Q	SOLALERT MINOR 26
						N09W67	0	0	0			N09W67	Q	MAGQUIET
						N03W49	9	0	0			N03W49	Q	STRATWARM
						S08W04	2	0	0			S08W04	Q	
						N21E23	6	0	0			N21E23	Q	
						N20E53	0	0	0			N20E53	Q	
						N11E60	0	0	0			N11E60	Q	
						N11E72	4	0	0			N11E72	A	

ALERT PERIODS

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027	27	26	190	192	005	N12W91	0	0	0		27	N12W91	Q	SOLNIL
						N10W80	1	0	0			N10W80	Q	MAGQUIET
						N03W63	2	0	0			N03W63	Q	STRATWARM
						S08W43	0	0	0			S08W43	Q	
						S09W20	0	0	0			S09W20	Q	
						N21E09	0	0	0			N21E09	Q	
						S12E29	1	0	0			S12E29	Q	
						N20E39	0	0	0			N20E39	Q	
						N10E47	0	0	0			N10E47	Q	
						N11E58	0	0	0			N11E58	E	
						S08E58	1	0	0			S08E58	Q	
						S13E71	6	0	0			S13E71	E	
028	28	27	182	203	010	N03W77	1	0	0	Presto Soflare	28	N03W77	E	SOLQUIET
						S07W59	0	0	0	M1/2B S13E61		S07W59	Q	MAGQUIET
						S09W33	1	0	0	27/2110Z Duration		S09W33	Q	STRATWARM
						N20W05	0	0	0	9 Minutes		N20W05	Q	
						S13E18	5	0	0			S13E18	Q	
						N20E26	1	0	0			N20E26	Q	
						N10E34	0	0	0			N10E34	Q	
						N10E44	1	0	0			N10E44	E	
						S09E44	3	0	0			S09E44	Q	
						S13E59	12	2	0			S13E59	E	
						N12E75	0	0	0			N12E75	Q	
029	29	28	264	233	015	N04W89	1	0	0	Presto Major Flare	29	N04W89	Q	SOLALERT
						S07W73	0	0	0	M8/3B N09E45		S07W73	Q	MAGQUIET
						S07W46	1	0	0	28/0656Z Duration		S07W46	Q	STRATWARM
						N21W18	3	0	0	39 Minutes.		N21W18	Q	
						N12E00	0	0	0	Tenflare 320 Flux		N12E00	Q	
						S13E05	7	0	0	Units 28/0701Z		S13E05	E	
						N20E12	1	0	0	Duration 45Minutes.		N20E12	Q	
						S10E29	5	0	0			S10E29	Q	
						N10E31	6	1	0			N10E31	A	
						N08E42	1	0	0			N08E42	Q	
						S14E46	14	1	0			S14E46	A	
						N10E59	0	0	0			N10E59	Q	
						N14E66	0	0	0			N14E66	Q	
						S14E74	2	0	0			S14E74	Q	
030	30	29	287	275	012	S08W61	1	0	0		30	S08W61	Q	SOLALERT 30/XX
						N21W32	0	0	0			N21W32	Q	MAGALERT 30/31
						S14E32	14	1	0			S14E32	A	STRATWARM
						N12W14	1	0	0			N12W14	Q	
						S13W09	7	1	0			S13W09	A	
						N21W01	1	0	0			N21W01	Q	
						S10E14	3	0	0			S10E14	E	
						N10E19	4	0	0			N10E19	E	
						N10E29	6	1	0			N10E29	Q	
						N11E44	2	0	0			N11E44	Q	
						N14E52	0	0	0			N14E52	Q	
						S15E63	1	0	0			S15E63	Q	
031	31	30	389	229	023	S08W75	1	0	0	Presto Soflare	31	S08W75	Q	SOLALERT 31/XX
						N21W45	1	0	0	X1/3B S15E12		N21W45	Q	MAGALERT 31/02
						S14W39	0	0	0	31/0010Z. Type II		S14W39	Q	
						N13W28	5	0	0	and Type IV Radio		N13W28	E	
						S13W21	3	0	0	Emission. Tenflare		S13W21	Q	
						N21W14	1	0	0	1200 Flux Units 30/		N21W14	Q	
						S09E00	2	0	0	2333Z Duration 65		S09E00	E	
						N10E05	5	0	0	Minutes. Proton		N10E05	E	
						N09E15	8	2	0	Event 31/0230Z		N09E15	E	
						S13E19	7	0	1	With 300 Particles		S13E19	P	
						N11E31	3	1	0	at Greater Than		N11E31	E	
						N15E40	1	0	0	10 MEV.		N15E40	Q	
						N17E50	0	0	0			N17E50	Q	
						S14E51	8	0	0			S14E51	Q	
						S15E63	1	0	0			S15E63	Q	
						S20E70	0	0	0			S20E70	Q	
						S16W74	0	0	0			S16E74	Q	
032	01	31	398	298	025	N21W58	0	0	0	Presto Magstorm	01	N21W58	Q	SOLALERT 01/03
						N13W41	2	0	0	31/0102Z. Proton		N13W41	E	MAGALERT 01/02
						S13W35	0	0	0	Event 31/1630Z		S13W35	Q	
						N20W30	0	0	0	With 800 Particles		N20W30	Q	
						S09W13	1	0	0	at Greater than 10		S09W13	Q	
						N10W07	2	0	0	MEV, PCA 212 DB at		N10W07	Q	
						N09E02	9	1	0	31/1830Z		N09E02	A	
						S13E06	5	1	0			S13E06	A	
						N10E17	4	1	0			N10E17	A	
						N15E25	0	0	0			N15E25	Q	
						N16E36	0	0	0			N16E36	Q	
						S15E37	4	0	0			S15E37	E	
						S14E48	0	0	0			S14E48	Q	
						S19E57	1	0	0			S19E57	Q	
						S15E62	0	0	0			S15E62	Q	
						S05E78	0	0	0			S05E78	Q	

RELATIVE SUNSPOT NUMBERS
INTERNATIONAL, R_I

1981 PROVISIONAL — 1982

DAY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
1	148	147	132	112	62	149	121	219	216	165	162	92
2	132	182	170	133	59	140	105	183	206	222	197	94
3	154	169	148	156	44	140	112	160	219	218	212	112
4	126	183	151	152	62	112	109	170	189	231	201	109
5	133	141	157	162	55	112	113	195	195	207	200	99
6	172	138	132	178	57	85	102	220	169	199	232	86
7	158	130	152	171	61	75	107	205	171	192	244	94
8	129	142	195	177	52	62	115	208	185	166	249	97
9	124	124	199	158	58	65	121	190	177	134	247	98
10	157	127	199	148	55	96	138	202	144	147	271	85
11	178	130	200	169	66	130	136	164	131	146	249	46
12	185	128	193	183	79	139	140	138	114	150	209	52
13	153	127	197	149	86	153	134	132	183	158	185	51
14	142	128	180	140	99	145	140	148	187	178	159	58
15	124	110	212	141	104	150	153	129	212	148	113	81
16	129	128	197	127	109	161	134	138	223	126	66	76
17	120	109	213	124	119	171	125	129	219	103	80	111
18	131	95	214	119	104	161	148	145	214	102	79	139
19	138	86	203	100	85	151	175	169	189	90	74	143
20	133	120	199	77	71	145	188	134	183	82	57	134
21	142	135	170	99	87	129	222	175	151	78	72	134
22	136	134	122	106	106	138	220	172	130	79	73	121
23	98	121	108	93	119	162	200	137	107	65	86	93
24	124	125	92	96	109	196	178	148	109	59	76	70
25	137	142	119	93	127	213	189	142	101	60	62	82
26	169	133	90	105	127	206	215	171	92	74	100	119
27	175	126	73	79	133	218	222	181	63	87	104	125
28	170	135	72	93	112	208	214	195	92	110	136	168
29		160	106	92	138	159	194	191	131	134	122	216
30		184	92	83	148	173	233	190	152	155	102	211
31		108		92		126	201		144		140	237
MEAN	143.5	133.8	156.2	126.0	89.8	144.2	158.2	169.3	161.2	135.6	147.1	110.7

1980 YEARLY MEAN = 154.6

* ZURICH R_Z SUNSPOT NUMBER REPLACED BY INTERNATIONAL R_I SUNSPOT NUMBER BEGINNING WITH JANUARY 1981 DATA.

DAILY SOLAR FLUX AT 2800 MHz
OTTAWA ARO
FLUX ADJUSTED TO 1 A.U., S_a

1981 — 1982

DAY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
1	207.3	224.4*	210.8*	188.0	149.6	175.4	183.9	248.3	210.6*	222.5*	230.7*	179.9
2	210.1	230.6*	211.2*	193.4	144.3	168.9	182.6	242.8	204.8*	241.3*	230.3*	177.2
3	205.4*	238.9*	221.2	206.5*	134.9	163.3*	192.4	229.0	196.5	255.3*	238.6	176.1
4	197.5	245.6*	219.7	221.2	133.8	165.9	190.6*	233.4	191.1	263.1	241.7	170.4
5	187.8	227.3	226.2	237.5	136.0	152.5	178.8	248.7	193.6*	254.1	260.0	165.5
6	185.4*	212.7	235.7	231.2	140.6	148.7	179.6	263.2*	200.3	244.6	262.1	166.8
7	180.5*	201.4	242.3	234.2	146.7	149.8	173.0	262.5*	204.1*	241.4	275.6*	166.9*
8	179.1	200.6*	268.8*	222.4*	146.7*	152.4	178.4	266.3*	200.7*	234.7*	287.8	156.9
9	176.7	202.9	287.7	218.6	152.8	150.0*	180.5	256.5	205.4*	232.6	292.4*	164.4
10	185.2	203.1	268.8*	217.7*	157.1	156.5*	182.0	247.6	213.4	231.0*	278.7	145.7
11	186.4*	199.7	272.1	228.1*	154.8	167.4	206.4	240.8	220.0	217.0	266.7*	136.3
12	190.6*	188.8	251.9	223.4	152.0	167.7*	209.0*	234.2	236.8*	223.5	254.2*	132.4
13	197.8	202.1	254.9*	221.3	152.6	174.2*	208.7	230.2	256.2	215.9	218.9	127.5
14	200.3	208.9	256.5*	232.5	159.1	184.2	208.2	228.7*	275.6	207.4	193.0	130.5
15	193.5	206.3*	254.9*	223.9	164.7	194.5*	225.1	230.4	287.1	191.2	172.6	136.3
16	186.9	194.9	247.5*	218.9	169.1	205.3*	221.8*	227.5	302.4	181.2	157.4	146.7
17	188.1*	181.5	242.7	207.6	171.2	200.8*	228.7	218.2*	302.9	172.7	144.2	152.6
18	190.2*	180.0	229.2	194.4	170.1	204.7*	244.1	216.5*	296.5*	160.8*	136.3*	167.6
19	178.8	175.1	214.9	186.6*	165.9	220.3	254.6*	210.5*	278.6	157.0	129.7	169.4
20	188.3	182.7	200.9*	180.0	159.8	234.7*	269.8	200.1	257.8*	152.0	133.9	167.0
21	189.9*	189.5	196.1	180.4	153.6	228.1*	267.1*	191.2	238.2	153.9	142.2	163.3
22	199.5	189.4*	191.5	169.3*	166.1*	235.9	262.2*	183.0	218.6	152.7	145.9	152.9
23	217.9*	188.0*	204.9	159.6	171.2*	254.7*	254.8	183.8	208.2	151.9	153.0	148.0
24	231.5*	191.4	203.0*	169.8	174.6	261.6*	258.9	182.2	201.1	150.4	156.1*	149.1
25	233.8	199.3	203.8*	177.2	183.6	259.7	254.8	182.0	186.0	159.1	162.1	169.3*
26	238.5	198.6*	198.8	173.8	193.9	273.1*	272.9*	188.8	172.0	178.3*	166.2	182.7*
27	235.4	197.6	194.7*	177.0	193.4	255.8*	281.6*	202.8	171.2	190.3	176.8	197.2
28	224.9*	203.7*	178.2*	181.3	191.6	223.6	275.3	200.9	182.4	206.4*	183.0	234.7
29	.	212.4*	176.9	170.6	187.5*	213.3	259.1	204.5	187.5	226.5*	183.6	267.0
30	.	208.2	175.3	164.6*	179.0	204.2*	265.1	203.8	201.5	231.6	185.7	284.5
31	.	214.0*	.	156.1	.	197.6	256.0*	.	207.1	.	182.8	289.1
MEAN	199.5	203.2	224.7	198.9	161.9	198.2	226.0	221.9	222.8	203.3	201.4	173.4

* adjusted for burst
A = interpolated data point

DAILY SOLAR INDICES

JANUARY 1982

DAY OF MONTH	YEAR DAY	BARTELS 27-DAY CYCLE NUMBER	PROVISIONAL SUNSPOT NUMBERS		OBSERVED FLUX	SOLAR FLUX ADJUSTED TO 1 A.U.							
			R_I	$R_{A'}$	OTTAWA 2800	AFGL 15400	AFGL 8800	AFGL 4995	OTTAWA 2800	AFGL 2695	AFGL 1415	AFGL 606	AFGL 410	AFGL 245
1	1	21	92	90	186.0	565	297	193	179.9		175			
2	2	22	94	94	183.2	598			177.2					
3	3	23	112	110	182.1	586	315	197	176.1		181			
4	4	24	109	107	176.2	501	277	179	170.4		168			
5	5	25	99	85	171.1	588			165.5					
6	6	26	86	82	172.5	577	303	184	166.8		157	80	44	
7	7	27	94	89	172.6*	554	295	191	166.9*		163	78	41	
8	8	1	97	83	162.3	587	306	180	156.9		148	102	37	
9	9	2	98	90	170.0				164.4					
10	10	3	85	61	150.7	555			145.7			120	47	
11	11	4	46	44	141.0	569	296	165	136.3		128	118	57	
12	12	5	52	52	136.9	560	294	165	132.4		121	115	63	
13	13	6	51	53	131.8	526	276	160	127.5		116			
14	14	7	58	57	135.0	565	292	159	130.5		117	102	53	
15	15	8	81	70	141.0	512	287	167	136.3		124	90	45	
16	16	9	76	80	151.6	559	291	173	146.7	155	132			
17	17	10	111	109	157.6				152.6					
18	18	11	139	129	173.1	593	312	187	167.6	175	146	123	51	
19	19	12	143	117	175.0	592	291	190	169.4	174	156	124	58	
20	20	13	134	129	172.5	587	278	183	167.0	168	147	100	47	
21	21	14	134	131	168.7				163.3					
22	22	15	121	119	157.8				152.9					
23	23	16	93	78	152.7				148.0					
24	24	17	70	62	153.9	589			149.1			98	46	
25	25	18	82	87	174.7*	604	298	198	169.3*		158	121	50	
26	26	19	119	105	188.5*	608	305	212	182.7*		163	102	42	
27	27	20	125	123	203.3	565	307	213	197.2	188	158	108	45	
28	28	21	168	172	242.0				234.7					
29	29	22	216	223	275.3				267.0					
30	30	23	211	241	293.3				284.5					
31	31	24	237	247	297.7				289.1					
MEAN			110.7	107.1	179.0	570	296	183	173.4	172	148	105	48	

*Adjusted for burst.
NOTE: Data gaps in AFGL Sagamore Hill data are due to equipment problems.

OBSERVED AND PREDICTED SOLAR ACTIVITY INDICES

	SUNSPOT NUMBERS						2800 MHz FLUX adjusted to 1 AU	
	Rz or R_I		Ra		Rs		Sa	
Date	Monthly Mean	Smoothed	Monthly Mean	Smoothed	Monthly Mean	Smoothed	Monthly Mean	Smoothed
Feb 79	137.5	131	136.8	123	153.0	124	199.1	172
Mar	138.0	136	132.5	128	136.7	128	184.0	176
Apr	101.5	141	95.8	133	127.0	133	175.0	180
May	134.4	147	121.8	139	120.4	139	168.9	186
Jun	149.5	153	136.4	144	138.9	144	186.0	191
Jul	159.4	155	140.5	145	123.1	145	171.4	192
Aug	142.2	155	125.1	144	129.2	145	177.0	192
Sep	188.4	156	184.0	143	156.5	144	202.3	191
Oct	186.2	158	178.2	144	171.7	145	216.4	192
Nov	183.3	162	176.5	149	182.9	149	226.8	196
Dec	176.3	164	157.6	152	151.0	152	197.2	199
Jan 80	159.6	164	145.3	153	153.6	154	199.6	200
Feb	155.0	163	133.9	154	148.7	155	195.1	200
Mar	126.2	161	107.9	153	117.8	153	166.5	200
Apr	164.1	159	138.5	151	164.0	152	209.3	198
May	179.7	156	172.3	149	185.4	151	229.1	197
Jun	157.3	155	153.6	149	153.2	151	199.3	198
Jul	136.3	153*	136.0	144	144.1	151	190.8	197
Aug	135.4	150*	133.0	144	121.9	150	170.3	196
Sep	155.0	150*	150.0	146	138.8	152	185.9	198
Oct	164.7	150*	160.8	149	157.1	154	202.9	200
Nov	147.9	148*	149.9	149	168.5	153	213.4	199
Dec	174.4	142*	167.5	145	174.3	150	218.8	196
Jan 81	114.4†	140*	115.4	144	120.5	149	169.0	195
Feb	143.5†	141*	143.7	146	153.5	152	199.5	198
Mar	133.8†	143*	149.2	149	157.5	156	203.2	202
Apr	156.2†	143*	169.2	149	180.7	158	224.7	204
May	126.0†	143*	141.3	149	152.8	159	198.9	204
Jun	89.8†	141*	99.0	147	112.9	158	161.9	203
Jul	144.2†	140*	154.3	145	152.1	157	198.2	203
Aug	158.2†	139(± 5)*	170.4	144	182.1	156	226.0	---
Sep	169.3†	137(± 9)*	174.5	142	177.7	154	221.9	---
Oct	161.2†	136(±11)*	157.0	141	178.6	152	222.8	---
Nov	135.6†	132(±12)*	138.8	137	157.6	148	203.3	---
Dec	147.1†	129(±13)*	145.0	133	155.5	144	201.4	---
Jan 82	110.7†	124(±13)*	---	128	124.2	139	173.4	---
Feb	---	121(±14)*	---	125	---	134	---	---
Mar	---	118(±14)*	---	122	---	131	---	---
Apr	---	115(±14)*	---	119	---	128	---	---
May	---	112(±14)*	---	115	---	124	---	---
Jun	---	108(±14)*	---	112	---	120	---	---
Jul	---	104(±13)	---	107	---	115	---	---

*An asterisk denotes either a value of the observed 12-month running mean or the predicted 12-month average that is based on preliminary observations of the Zurich and International relative sunspot numbers (R_Z and R_I). Parentheses enclose the 90% confidence limits. Shaded boxes enclose the most recent smoothed values; boxes not shaded enclose predicted values. Ra is the new symbol for R_A'. All tabulated entries of Ra are final values.

†R_I replaces R_Z as of January 1981.

SMOOTHED OBSERVED AND PREDICTED SUNSPOT NUMBERS
CYCLE 21

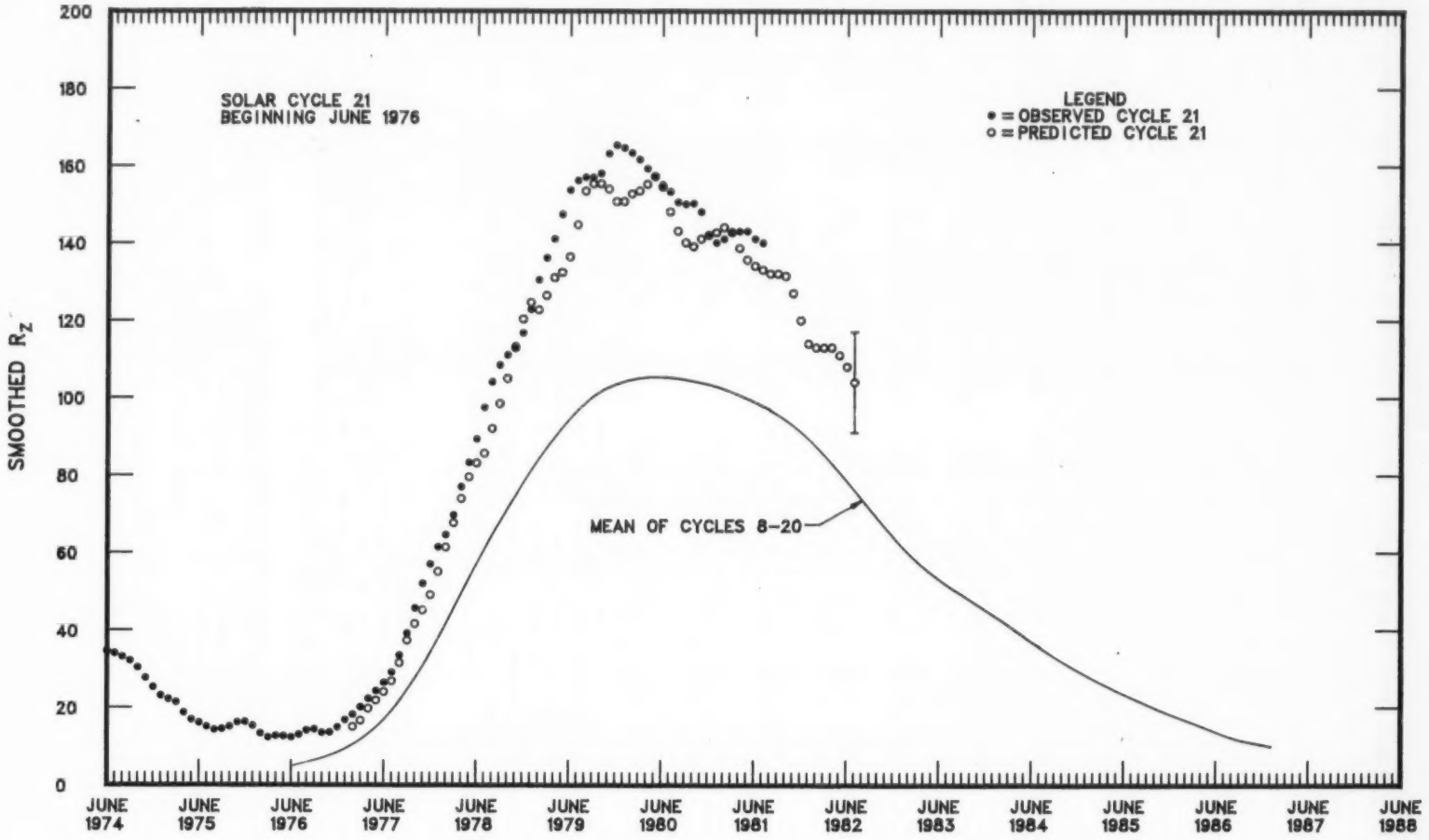
MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1976	15	13	12	13	13	12	13	14	14	13	14	15
1977	17	18	20	22	24	26	29	33	39	46	52	57
1978	61	65	70	77	83	89	97	104	108	111	113	118
1979	124	131	137	141	147	153	155	155	156	158	162	165*
1980	164	163	161	159	156	155	153	150	150	150	148	142
1981	140	141	143	143	143	141	140	[139	137	136	132	129
								[(5)	(9)	(11)	(12)	(13)
1982	124	121	118	115	112	108	104	99	95	89	85	82
	(13)	(14)	(14)	(14)	(14)	(14)	(13)	(10)	(9)	(7)	(8)	(9)
1983	78	75	74	71	68	66	64	63	61	61	61	60
	(9)	(9)	(11)	(13)	(15)	(17)	(19)	(21)	(23)	(24)	(24)	(25)
1984	58	56	53	49	47	47	46	44	42	40	39	37
	(26)	(25)	(26)	(27)	(28)	(29)	(29)	(29)	(28)	(27)	(26)	(26)
1985	36	35	34	34	33	32	30	29	29	28	27	26
	(26)	(25)	(24)	(24)	(24)	(23)	(21)	(20)	(20)	(21)	(22)	(22)
1986	26	25	24	22	20	19	17	16	15	15	14	14
	(22)	(23)	(22)	(22)	(21)	(20)	(19)	(19)	(17)	(16)	(15)	(13)
1987	14	13	14	14	15	16	17					
	(12)	(12)	(12)	(13)	(14)	(15)	(16)					

The table gives observed *smoothed* sunspot numbers for Cycle 21 up to the one calculated from the latest observed data, marked by a left-hand bracket. They are based on final Zürich numbers through 1980 and provisional International numbers thereafter. Some of these data after the June 1976 value will change slightly when final data for 1981 are included. The numbers after the bracket are predictions by the McNish-Lincoln method (see *Explanation of Data Reports*, February 1981). Shown in parentheses are the corresponding absolute values of the 90% confidence interval, an indication of the uncertainty above and below the predicted number.

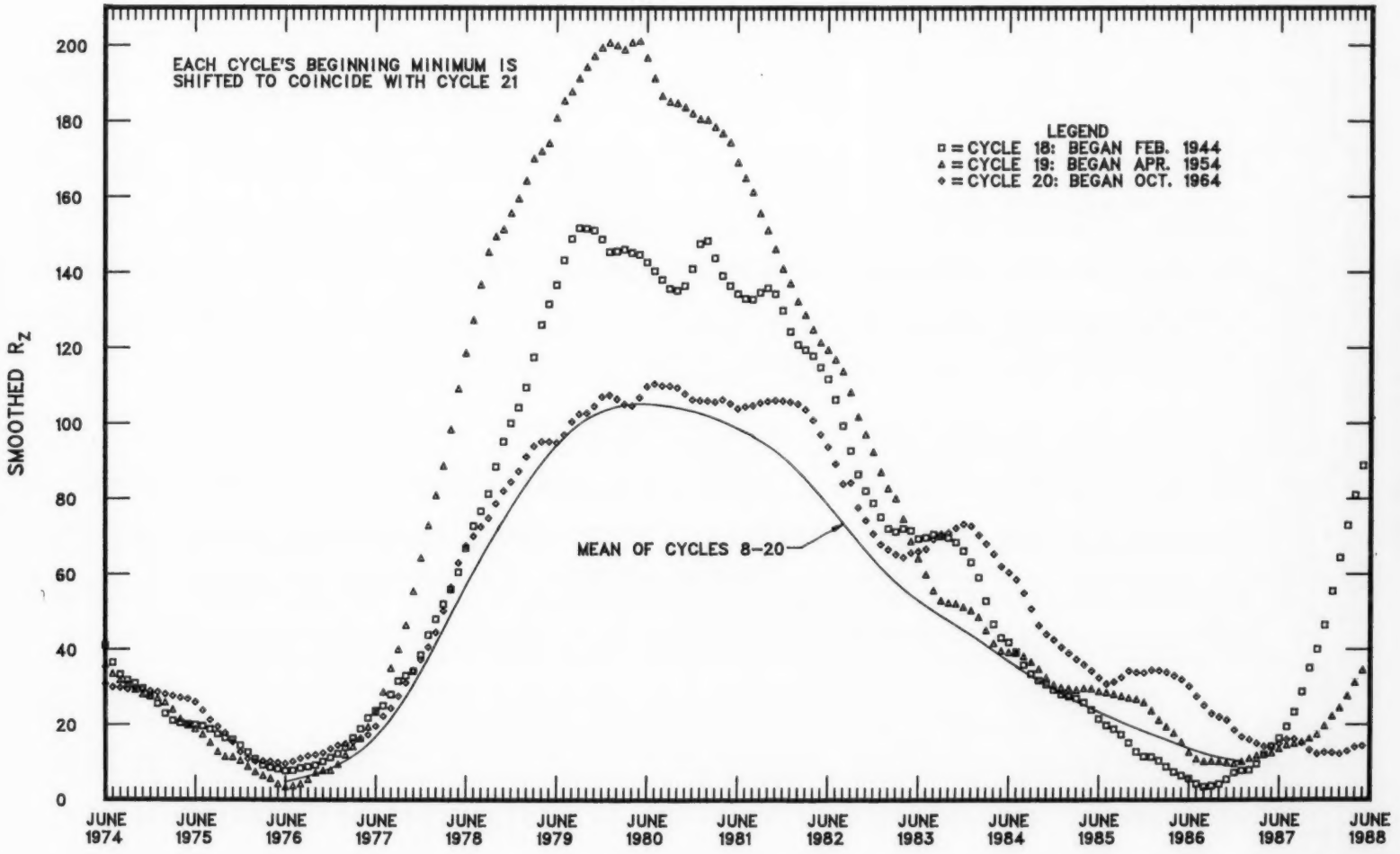
The McNish-Lincoln prediction method is recommended for predictions up to only one year ahead. From that point, the predictions regress rapidly toward the mean value. Furthermore, the method is very sensitive to the identification of a minimum epoch. In SGD issues 390-401, the Cycle 21 predictions were based on March 1976 as the minimum epoch. Later studies, including one published by Waldmeier, show that June 1976 is the more appropriate epoch of minimum. Thus, we adopted a June 1976 minimum.

*MAXIMUM OF SUNSPOT CYCLE 21. The maximum smoothed sunspot number occurred in December 1979.

OBSERVED AND ONE-YEAR-AHEAD PREDICTED SMOOTHED SUNSPOT NUMBERS



SUPERPOSITION OF CYCLES 18, 19, AND 20



15
Jan 82

Hα SOLAR FLARES

JANUARY 1982

OBSERVATORY	OBSERVED UT				LOCATION				CMP. DAY	DURATION — MIN.	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DAY	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	HALE PLAGE REGION				COND.	TYPE	TIME — UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
PURP	01	0044E	0045	0059	N24	E35	.640		3.7	15	SN		P	0045	118	1.6	
PURP	01	0059	0100	0116	N19	W74	.961		6.6	17	1B		C	0100	78		
MANI	01	0100E	0101	0115D	N17	W73	.956		6.5	15D	SN	3	C		80		
LEAR	01	0416	0417	0429	N19	E32	.575		3.6	13	SF	3	C		56		
LEAR	01	0435	0437	0459	N21	E32	.587		3.6	24	SF	3	C		100		
LEAR	01	0534	0536	0554	N21	E31	.575		3.6	20	SF	3	C		51		
RAMY	01	1401	1421	1455	N25	E24	.528		3.4	54	SF	3	C		84		
RAMY	01	1455	1459	1506	N21	W77	.974		7.4	11	SF	3	C				
RAMY	01	1625	1625	1633	N10	E36	.594		4.4	8	SF	3	C		25		
RAMY	01	1651	1655	1753	N24	E22	.498		3.4	62	SF	3	C		79		
RAMY	01	1750	1801	1838	N21	E33	.599		4.2	48	SN	3	C		39		
RAMY	01	1831	1854	1859	N21	E24	.492		3.6	28	SF	3	C		20		
PALE	01	1932	1935	1942	N21	E16	.403		3.0	10	SF	3	C		24		
PALE	01	1938	1938	1948	N22	E31	.582		4.1	10	SF	3	C		25		
PALE	01	2113	2114	2122	N21	E30	.563		4.1	9	SF	3	C		19		
LEAR	02	0442	0443	0458	N24	E15	.429		3.3	16	SN	3	C		96		
LEAR	02	0617	0620	0645	N18	W79	.980		8.2	28	1B	3	C				
LEAR	02	1000	1002	1010	N10	E40	.647		5.4	10	SF	3	C		26		
WEND	02	1345E		1402	N25	E16	.450		3.8	17	SF		C	1345	12	.1	H
RAMY	02	1358E	1413U	1418	N23	E12	.391		3.5	20	SF	3	C		29		
RAMY	02	1642	1643	1649	N23	E13	.399		3.7	7	SN	3	C		42		
RAMY	02	1710	1726	1732	N24	E08	.379		3.3	22	SF	3	C		23		
RAMY	02	1830	1834	1840	S38	E77	.978		8.5	10	SN	3	C				
WEND	03	1210		1215D	N10	E11	.222		4.3	5D	SN		C	1210	46	.5	
WEND	03	1349	1355	1400	S37	E64	.924		8.4	11	SF		C	1355	20		D
HOLL	03	1647	1647	1702	N10	E10	.208		4.4	15	SF	3	C		25		
HOLL	03	1702	1708	1729	N09	E07	.157		4.2	27	SF	3	C		62		
HOLL	03	1709	1710	1714	S35	E68	.941		8.8	5	SF	3	C		17		
RAMY	03	1836	1950	2020D	S35	E65	.926		8.6	104D	SB	3	C		59		
HOLL	03	1952E	1952U	2003	S34	E64	.919		8.6	11	SN	3	C		37		
HOLL	03	2002	2002	2010	N09	E08	.171		4.4	8	SF	3	C		43		
HOLL	03	2014	2014	2019	S34	E64	.919		8.6	5	SF	3	C		17		
HOLL	03	2059	2102	2107	N25	W11	.410		4.7	8	SF	3	C		37		
HOLL	03	2246	2248	2251	S35	E61	.903		8.5	5	SF	3	C		31		
PALE	04	0043	0044	0052	N09	E02	.104		4.2	9	SN	3	C		39		
PEKG	04	0045E	0046U	0051	N09	E03	.111		4.3	6	SF		P	0046	67	.7	E
PALE	04	0121	0127	0140	N25	W14	.430		5.1	19	SF	3	C		94		
PEKG	04	0131E	0132U	0140	N28	W14	.470		5.1	9	SF		P	0132	50	.6	D
PALE	04	0202	0203	0244	N09	E02	.104		4.2	42	SF	3	C		41		
PEKG	04	0225	0230U	0230D	N09	E01	.100		4.2	5D	SF		P	0230	63	.7	E
PALE	04	0318	0324	0329	N12	E36	.597		6.8	11	SF	2	C		23		
PALE	04	0332	0334	0335	N12	E35	.584		6.8	3	SF	2	C		24		
PEKG	04	0335	0339	0339D	N09	W00	.098		4.1	4D	SN		P	0339	168	1.8	E
LEAR	04	0336	0339	0422	N09	E01	.100		4.2	46	1N	3	C		207		
PALE	04	0337	0339	0344D	N08	W00	.081		4.2	7D	SN	2	C		150		
LEAR	04	0532	0532	0545	N08	E00	.081		4.2	13	SF	3	C		44		
ISTA	04	0722		750	S17	E59	.861		8.7	28	1N						U
ISTA	04	0808	0811	0815	N22	W18	.431		5.7	7	SN						D
MANI	04	0812E	0813U	0816	N22	W15	.401		5.5	4	SF	3	C		19		
LEAR	04	0921	0921	0935	N08	W02	.088		4.5	14	SF	3	C		26		
ATHN	04	1030E	1047U	1050D	N09	E01	.100		4.5	20D	SN	3	C		95		
HOLL	04	1523E	1525U	1605D	N21	W24	.489		6.4	42D	SF	3	C		164		
HOLL	04	1628E	1642	1706	N09	W04	.120		5.0	38	SF	3	C		58		
HOLL	04	1759	1801	1812	N10	W03	.127		5.0	13	SF	3	C		164		
RAMY	04	1800E	1803	1822	N09	W02	.104		4.9	22	SF	3	C		113		
HOLL	04	1915	1918	1936	N09	W06	.143		5.3	21	SN	3	C		56		
RAMY	04	1917	1917	2004	N09	W08	.169		5.4	47	SF	3	C		31		
HOLL	04	2140E	2141	2201	N08	W08	.160		5.5	21	SN	2	C		84		
PALE	04	2146	2147	2155D	N09	W06	.143		5.4	9D	SF	3	C		41		
LEAR	04	2253	2259	2301D	N08	W06	.132		5.4	8D	SF	3	C		27		
PURP	05	0141	0147	0200	S19	E32	.572		7.5	19	SN		V	0147	105	1.3	
PURP	05	0459	0504	0511	S20	E30	.553		7.5	12	SN		C	0504	92	1.1	
PURP	05	0804E	0804	0814	S37	E48	.822		8.9	10	SB		V	0804	98	1.6	E
RAMY	05	1343	1344	1400	N27	W34	.644		8.1	17	SN	3	C		61		
RAMY	05	1356	1410	1417	S35	E39	.742		8.5	21	SF	3	C		45		
RAMY	05	1843	1844	1850	N08	E25	.427		7.7	7	SN	3	C		40		
HOLL	05	1942E	1943	2012	N10	W51	.777		9.6	30	SB	3	C		85		
HOLL	05	2000	2000	2014	S13	E35	.586		8.5	14	SF	3	C		30		

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IM POR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DAY	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	HALE PLAGE REGION	CMP. DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
LEAR	06	0251	0253	0307	S35	E34	.701		8.7	16	SF	3	C		29		
LEAR	06	0259	0304	0327	N20	W24	.478		7.9	28	SN	3	C		64		
PEKG	06	0310	0311	0312	N22	W27	.530		8.2	2	SF		C	0311	59	.7	E
LEAR	06	0527	0532	0554	N09	W25	.429		8.1	27	SF	3	C		57		
LEAR	06	0629E	0631	0652	N06	W23	.391		8.0	23	SF	3	C		82		
LEAR	06	0712	0746	0806	N09	W25	.429		8.2	54	SN	3	C		112		
LEAR	06	0740	0740	0745	S18	E85	.995		12.7	5	SF	3	C				
PEKG	06	0753	0759	0802D	N07	W25	.425		8.2	9D	1N		P	0759	189	2.2	E
LEAR	06	0907	0907	0925	N10	W27	.463		8.4	18	SF	3	C		24		
LEAR	06	2257	2257	2311	N10	W36	.592		9.7	14	SF	3	C		77		
LEAR	06	2316	2320	2338	N10	W37	.606		9.7	22	SF	3	C		176		
PURP	07	0223E	0247	0250	N10	W40	.645		10.1	27	1F		P	0247	262	3.5	
LEAR	07	0231	0233	0303	N10	W36	.592		9.8	32	SN	3	C		84		
LEAR	07	0437	0438	0501	S37	E21	.622		8.8	24	SF	3	C		24		
LEAR	07	0612	0614	0628	N06	W36	.587		10.0	16	SF	3	C		42		
LEAR	07	0816	0823	0903	N10	W40	.645		10.3	47	SN	3	C		100		
RAMY	07	1642E	1642U	1704	S21	W04	.305		8.0	22	SF	3	C		29		
HOLL	07	1702E	1704	1713	N10	W50	.766		11.5	11	SN	3	C		175		
RAMY	07	1703E	1704U	1809	N10	W47	.732		11.2	66	1F	3	C		236		
RAMY	07	1942E	1942U	1958	N10	W48	.743		11.4	16	SN	3	C		85		
PALE	07	1946E	1946U	1951D	N08	W48	.742		11.4	5D	SF	3	C		40		
HOLL	07	2212	2214	2226	N09	W51	.776		11.7	14	SF	3	C		50		
LEAR	08	0025	0025	0035	N09	W51	.776		11.8	10	SN	3	C		17		
LEAR	08	0203	0205	0233	N10	W51	.777		11.9	30	SB	3	C		132		
PURP	08	0214E	0217	0241	N09	W51	.776		11.9	27	1N		P	0217	144	2.4	
PEKG	08	0537	0543	0555	N09	W53	.797		12.2	18	SN		C	0543	63	1.1	E
LEAR	08	0540E	0544	0624	N08	W52	.787		12.1	44	SN	3	C		85		
LEAR	08	0800	0805	0815	S16	W13	.303		9.3	15	SF	3	C		55		
LEAR	08	0940	0943	1004	N09	W57	.837		12.7	24	SN	3	C		39		
RAMY	08	1354	1432	1913D	N10	W60	.864		13.1	319D	2B	3	C		446		
HOLL	08	2024	2027	2030	N08	W60	.864		13.3	6	SF	3	C		19		
HOLL	08	2032	2034	2036	N08	W59	.855		13.3	4	SF	3	C		21		
LEAR	09	0131	0141	0149	N09	W62	.881		13.7	18	1N	3	C		131		
PALE	09	0137	0138U	0147	N08	W63	.889		13.8	10	SN	1	C		120		
PEKG	09	0138	0142	0148	N11	W63	.889		13.8	10	1N		C	0142	105	2.6	E
MANI	09	0141E	0141	0148D	N09	W63	.889		13.8	7D	SN	3	C		90		
LEAR	09	0357	0402	0422	N21	W54	.820		13.2	25	SF	3	C		42		
LEAR	09	0508	0528	0616D	S19	W21	.430		10.8	68D	1N	3	C		298		
PEKG	09	0510	0532	0600	S19	W22	.442		10.9	50	SN		C	0532	176		F
PURP	09	0724	0738	0758	N11	W67	.918		14.3	34	1N		C	0738	137		
LEAR	09	0729	0735	0753	N10	W67	.918		14.3	24	SN	3	C		110		
MANI	09	0736E	0736U	0739D	N10	W68	.925		14.4	3D	SN	2	C		100		
LEAR	09	0933	0935	0937	N08	W65	.904		14.3	4	SN	3	C		44		
LEAR	09	0946	0949	0954	N08	W68	.925		14.5	8	SN	3	C		32		
RAMY	09	1223	1505	1522	N09	W69	.931		14.7	179	SF	3	C		67		
RAMY	09	1358	1404	1720D	S36	W08	.544		10.2	202D	1F	3	C		339		
RAMY	09	1358	1433	1449	S08	E39	.629		12.5	51	SF	3	C		19		
PALE	09	1945	1950	1959	N08	W73	.954		15.3	14	SN	4	C				
PALE	09	2018	2018	2025	N10	W80	.983		15.8	7	SF	4	C				
LEAR	09	2351	2351	2356	N09	W73	.954		15.5	5	SF	3	C				
LEAR	10	0050	0051	0057	S20	W29	.537		12.2	7	SF	3	C		61		
LEAR	10	0245	0246	0249	N10	W75	.964		15.7	4	SF	3	C		17		
PALE	10	0245	0246	0248	N12	W78	.976		16.0	3	SF	3	C				
RAMY	10	1247	1254	1319	S35	W22	.603		12.2	32	SF	3	C		84		
RAMY	10	1430	1441	1454	N11	W89	1.000		17.3	24	SF	3	C				
HOLL	10	1548	1548	1600	S16	W39	.645		13.6	12	SF	3	C		19		
RAMY	10	1654	1714	1732	S17	W38	.635		13.6	38	SF	3	C		58		
RAMY	10	1658	1705	1738	N10	W41	.657		13.8	40	SN	3	C		79		
HOLL	10	2109	2111	2119	S19	W37	.631		13.7	10	SN	3	C		55		
RAMY	11	1312	1315	1332	N10	W51	.776		15.4	20	SN	3	C		78		
RAMY	11	1316	1318	1332	S22	W18	.422		12.9	16	SF	3	C		37		
RAMY	11	1316	1338	1403	S16	W50	.772		15.3	47	SF	3	C		43		
RAMY	11	1608	1616	1632	S19	W49	.767		15.3	24	SN	3	C		27		
RAMY	11	1633	1646	1648	S20	W55	.827		15.8	15	SF	3	C		20		
RAMY	11	1705	1710	1726	S15	W52	.791		15.6	21	SF	3	C		21		
RAMY	11	2005	2006	2031	S21	W22	.458		13.5	26	SN	3	C		109		
RAMY	11	2010	2011	2019	S09	E66	.911		16.8	9	SF	3	C		22		

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IM-POR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DAY	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	HALE PLAGE REGION	CMP. DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
MANI	12	0210E	0210U	0220D	S09	E67	.918		17.1	10D	SN	3	C		60		
LEAR	12	0318	0321	0335	S37	W41	.764		15.2	17	SF	3	C		31		
RAMY	12	1441	1443	1447	S10	E58	.846		17.0	6	SF	3	C		23		
RAMY	12	1452	1507	1519	S08	E53	.797		16.6	27	SN	3	C		40		
LEAR	13	0128E	0135	0220D	S20	W72	.949		18.5	52D	1B	3	C		193		
PEKG	13	0130E	0138	0203	S18	W72	.949		18.5	33	1B		P	0138	223		E
MANI	13	0133E	0135	0155D	S19	W71	.943		18.4	22D	1N	3	C		150		
MANI	13	0223E	0224U	0233D	S22	W71	.944		18.4	10D	SN	3	C		50		
LEAR	13	0301	0313	0316	S19	W71	.943		18.5	15	SF	3	C		21		
RAMY	13	1747	1757	1837	S09	E43	.681		17.0	50	SN	3	C		43		
HOLL	13	1756	1759	1806	S09	E44	.694		17.0	10	SN	3	C		60		
RAMY	13	1854	1855	1908	S09	E41	.656		16.9	14	SF	3	C		28		
HOLL	13	2126	2134	2145	S10	E37	.603		16.7	19	SF	3	C		39		
PURP	14	0039	0043	0057	S11	E38	.618		16.9	18	SB		C	0043	105	1.3	E
WEND	14	0957	1002	1010	S13	E36	.596		17.1	13	SF		C	1002	44	.6	
PEKG	15	0201	0211	0250	N05	E11	.190		15.9	49	SN		P	0211	67	.7	DK
PEKG	15	0201	0232	0250	N04	E11	.191		15.9	49	SF		P	0232	92	1.0	E
PEKG	15	0356	0401	0425	S09	E27	.457		17.2	29	SN		P	0401	97	1.1	D
WEND	15	0922	0932	0949	N03	E07	.125		15.9	27	SF		C	0932	56	.6	
WEND	15	1027	1029	1038	N03	E07	.125		16.0	11	SF		C	1029	25	.3	
WEND	15	1229	1248	1313	N04	E06	.105		16.0	44	SF		C	1248	100	1.0	
PEKG	16	0450E	0500	0520	N03	W03	.060		16.4	30	1F		P	0500	210	2.2	E
PURP	16	0628E	0628	0634	N02	W03	.070		16.5	6	SN		V	0628	138	1.4	
PEKG	16	0815	0818	0825	N03	W06	.108		16.8	10	SN		P	0818	168	1.8	E
ISTA	16	0815		830	N02	W05	.098		16.7	15	1N						E
WEND	16	0903	0912	0912D	N02	W03	.070		16.6	9D	SF		C	0912	44	.5	
WEND	16	1113	1127	1136	N02	W04	.083		16.8	23	SF		C	1127	69	.7	
WEND	16	1214E	1220	1237	N02	W05	.098		16.9	23	SN		C	1220	63	.7	
WEND	16	1245	1302	1400	N02	W04	.083		16.8	75	SN		C	1302	106	1.1	E
HOLL	16	1605	1605	1611	N01	W09	.168		17.3	6	SN	3	C		41		
HOLL	16	1608	1611	1625D	S12	E03	.138		16.9	17D	SF	3	C		55		
HOLL	16	1639	1643	1708	S12	E03	.138		16.9	29	SN	3	C		111		
HOLL	16	1750	1759	1811	N01	W11	.201		17.6	21	SF	3	C		48		
HOLL	16	1822	1837	1847	N01	W12	.217		17.7	25	SF	3	C		103		
HOLL	16	1844	1845	1853	S12	E01	.129		16.9	9	SF	3	C		29		
HOLL	16	1956	1956	2016	S11	E00	.111		16.8	20	SN	3	C		37		
HOLL	16	2025	2026	2055D	N02	W13	.229		17.8	30D	SN	3	C		47		
LEAR	16	2342E	2345	0003	S11	W01	.112		17.1	21	SF	3	C		72		
LEAR	17	0056	0106	0125	S12	W02	.131		17.2	29	SF	3	C		45		
LEAR	17	0150	0150	0213	S11	W03	.121		17.3	23	SF	3	C		30		
PURP	17	0348	0359U	0400D	S14	E00	.161		17.2	12D	SN		V	0359	111	1.2	E
PEKG	17	0525E	0525	0525D	S11	W04	.129		17.5		SN		P	0525	101	1.0	E
PEKG	17	0525E	0525	0540	N02	W19	.328		18.7	15	SF		P	0525	50	.6	D
ISTA	17	0750		900D	S16	E07	.228		17.9	70D	1B						BK
ISTA	17	0800		830	S20	W25	.480		19.2	30	SN						U
ISTA	17	0800		900D	S11	W31	.520		19.7	60D	SB						FK
ISTA	17	0815		835	S08	W05	.104		17.7	20	1B						H
LEAR	17	0929	0930	0932D	S15	E05	.197		17.8	3D	SF	3	C		36		
HOLL	17	1704	1707	1750D	N01	W25	.426		19.6	46D	SF	3	C		29		
RAMY	17	1705	1710	1742	N02	W25	.424		19.6	37	SF	3	C		49		
HOLL	17	1931	1933	1944	S07	W35	.572		20.4	13	SF	3	C		29		
HOLL	17	1950	2046	2107	S08	W37	.600		20.6	77	SF	3	C		61		
HOLL	17	1953	1953	2024	S12	W12	.240		18.7	31	SF	3	C		25		
RAMY	17	2035	2038	2107	S07	W13	.227		18.8	32	SF	3	C		32		
RAMY	17	2042	2046	2110D	S07	W38	.614		20.7	28D	SN	3	C		46		
HOLL	17	2131	2134	2138	S07	W36	.586		20.6	7	SF	3	C		31		
LEAR	17	2343	2345	2354	S09	W15	.267		19.1	11	SF	3	C		42		
LEAR	18	0523	0548	0706	S10	W13	.240		19.2	103	1N	3	C		272		
PEKG	18	0538	0600	0705	S07	W15	.260		19.4	87	1N		C	0600	273	2.9	F
PURP	18	0540	0600	0645	S09	W17	.299		19.5	65	1N		C	0600	249	2.6	
ISTA	18	0833		838	S07	W43	.680		21.6	5	SF						D
ISTA	18	0835		844	S11	W20	.354		19.9	9	SF						D
WEND	18	1028		1037D	S10	W27	.458		20.5	9D	SN		C	1034	100	1.2	
MONT	18	1032	1039	1056	S11	W27	.461		20.5	24	SF		C	1039	50		E
WEND	18	1430	1436	1446	S14	W15	.299		19.7	16	SB		C	1436	120	1.3	
HOLL	18	1520	1545	1546	S08	W49	.752		22.3	26	SF	3	C		53		

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IM-POR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DAY	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	HALE PLAGE REGION	CMP. DAY	MIN.		COND.	TYPE	TIME — UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
HOLL	18	1538	1544	1600	S14	W14	.285		19.7	22	SF	3	C		51		
HOLL	18	1643	1818	2134	S09	W47	.729		22.2	291	SN	3	C		117		
HOLL	18	1832	1910	1958	S11	W24	.415		20.6	86	SF	3	C		89		
HOLL	18	1843	1845	1853	S13	W15	.291		19.9	10	SF	3	C		59		
RAMY	18	1955	2019	2053D	S10	W26	.443		20.8	58D	SF	3	C		70		
RAMY	18	1956	2044	2053D	S07	W52	.785		22.7	57D	SN	3	C		143		
RAMY	18	2021	2052	2053D	S12	W16	.298		20.0	32D	SF	3	C		113		
PEKG	19	0055E	0055	0055D	S11	W53	.796		23.0		SN		C	0055	50	.9	E
PURP	19	0253E	0253	0321D	N00	W44	.697		22.4	28D	SN		C	0253	138	1.9	
PEKG	19	0316E	0318	0342	S07	W57	.836		23.4	26	SN		C	0318	76	1.4	EK
PEKG	19	0316E	0318	0342	N02	W43	.682		22.4	26	SN		P	0318	139	2.0	F
PEKG	19	0316E	0340	0342	S07	W57	.836		23.4	26	SN		C	0340	118	2.1	F
PEKG	19	0755E	0759	0805	S07	W57	.836		23.6	10	SN		P	0759	50	1.0	D
PEKG	20	0129	0130	0132	N02	W60	.866		24.6	3	SF		P	0130	13	.3	D
PEKG	20	0229	0230	0234	S07	W69	.931		25.3	5	SF		P	0230	21		E
PEKG	20	0315	0322	0345	S06	W68	.925		25.2	30	SN		P	0322	71		E
PEKG	20	0317	0328	0330	S07	W43	.679		23.4	13	SN		P	0328	42	.6	E
PEKG	20	0551E	0554	0609	S06	W73	.954		25.7	18	1B		P	0554	218		E
ISTA	20	0655		710	S09	E31	.515		22.6	15	SN						
PEKG	20	0659E	0659	0720	S25	E18	.445		21.6	21	1N		P	0659	181	2.1	F
PURP	20	0701E	0701	0712	S26	E20	.476		21.8	11	SN		P	0701	151	1.7	
WEND	20	0901	0903	0910	S08	W47	.729		23.9	9	SF		C	0903	56	.9	
WEND	20	1041	1054	1136	S08	W47	.729		24.0	55	SF		C	1054	113	1.7	
WEND	20	1157	1231	1308	N04	E27	.453		22.5	71	1N		C	1231	425	4.9	E
RAMY	20	1848	1853	1907	S03	E23	.391		22.5	19	SN	3	C		75		
HOLL	20	1848	1852	1859	S02	E22	.377		22.4	11	SN	3	C		63		
RAMY	20	1855	1859	1902	S10	W52	.785		24.7	7	SF	3	C		18		
PEKG	21	0050	0055	0059	N03	W69	.933		26.2	9	SF		P	0055	59		E
PEKG	21	0203	0220	0228	N04	W70	.938		26.3	25	SN		P	0228	42		D
PEKG	21	0236	0255	0259	S09	E64	.895		25.9	23	SN		P	0255	34	.8	D
WEND	21	0957	1003	1028	S08	W85	.995		27.8	31	SN		C	1003	31		
WEND	21	1026	1031	1039	S09	E58	.845		25.8	13	SF		C	1031	38	.7	
WEND	21	1035	1037	1049	S08	W87	.998		28.0	14	SF		C	1037	19		
WEND	21	1056	1106	1117	N06	E16	.275		22.7	21	SF		C	1106	125	1.4	E
WEND	21	1205	1212	1250	S03	E12	.211		22.4	45	SN		C	1212	113	1.2	
WEND	21	1241	1243	1254	S14	W67	.917		26.6	13	SF		C	1243	38		
WEND	21	1312		1330	S08	W88	.999		28.1	18	SN		C	1318	20		
RAMY	21	1412	1438	1455	S07	E54	.806		25.6	43	SF	3	C		106		
HOLL	21	1603	1603	1615	S04	E10	.174		22.4	12	SF	3	C		24		
HOLL	21	1606	1606	1612	S07	E56	.826		25.9	6	SF	3	C		15		
HOLL	21	1625	1627	1635	S07	E54	.806		25.7	10	SF	3	C		28		
RAMY	21	1803	1848	1946	S04	E09	.157		22.4	103	SN	3	C		101		
HOLL	21	1948	1949	2007	S09	E54	.806		25.9	19	SF	3	C		40		
HOLL	21	1956	2003	2015	N04	E11	.191		22.7	19	SF	3	C		83		
HOLL	21	2013	2014	2019	S05	E09	.156		22.5	6	SF	3	C		33		
HOLL	21	2238	2249	2322D	S04	E07	.123		22.5	44D	1N	3	C		216		
PEKG	22	0153E	0200	0212	N08	W26	.438		24.0	19	SN		P	0200	63		E
PEKG	22	0256	0259	0317	N04	W85	.996		28.5	21	SN		C	0259	34		D
PEKG	22	0314E	0314	0314D	S09	E51	.774		26.0		SN		P	0314	38	.6	D
PEKG	22	0359	0401	0405	S09	E50	.763		25.9	6	SN		P	0401	67	1.1	D
PEKG	22	0423	0445	0502	N06	W78	.977		28.0	39	2B		P	0445	252		FAH
PEKG	22	0440	0503	0510	N05	W82	.989		28.3	30	SN		P	0503	42		E
PEKG	22	0440	0452	0510	N05	W80	.984		28.2	30	1B		P	0452	126		F
PEKG	22	0750	0754	0758	S09	E48	.740		25.9	8	SF		P	0754	8	.1	D
RAMY	22	1255	1256	1312	S07	E43	.679		25.8	17	SN	3	C		27		
RAMY	22	1457	1459	1518	S10	W76	.967		28.3	21	SF	3	C				
LEAR	22	2316E	2316U	2334	N11	W33	.547		25.4	18	SF	3	C		34		
HOLL	23	2233	2238	2256	N04	W19	.325		25.4	23	SF	3	C		58		
LEAR	24	0505	0507	0512	S02	W24	.410		26.0	7	SF	3	C		36		
RAMY	24	1302	1322	1340	N02	W30	.502		26.8	38	SF	3	C		49		
RAMY	24	1348	1350	1409	N04	W29	.484		26.7	21	SN	3	C		85		
RAMY	24	1623E	1632U	1705	N04	W30	.499		26.9	42	SF	3	C		29		
HOLL	24	1635	1637	1647	N01	W32	.533		27.1	12	SF	3	C		23		
RAMY	24	1711	1728	1731	N11	W60	.862		29.2	20	SF	3	C		15		
RAMY	24	1722	1733	1737	N20	E41	.675		27.8	15	SF	3	C		21		
RAMY	24	1816	1819	1842	N04	W30	.499		27.0	26	SF	3	C		44		

Hα SOLAR FLARES

JANUARY 1982

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IM-POR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DAY	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	HALE PLAGE REGION	CMP. DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
PALE	24	1947E	2001	2030D	N12	E85	.995		31.2	43D	SN	2	C				
HOLL	24	1949	1959	2113	N07	E77	.972		30.6	84	1B	3	C				
HOLL	24	2012	2012	2113	N07	E77	.972		30.6	61	1B	3	C				
HOLL	24	2020	2022	2056	N04	W30	.499		27.1	36	SN	3	C		123		
HOLL	24	2123	2129	2136	N20	E69	.930		30.1	13	SN	3	C				
LEAR	25	0608	0610	0636	N02	W40	.644		28.3	28	SF	3	C		57		
WEND	25	1326	1331	1353	N06	E81	.986		31.6	27	SF		C	1331	25		
RAMY	25	1329E	1341	1411	N20	E27	.500		27.6	42	SN	3	C		64		
RAMY	25	1331	1334	1352	N07	E80	.983		31.6	21	SN	3	C				
RAMY	25	1338	1343	1358	N01	W43	.684		28.8	20	SF	3	C		49		
RAMY	25	1441	1443	1450	N19	E27	.494		27.6	9	SN	3	C		99		
WEND	25	1441	1445	1449	N21	E29	.532		27.8	8	SF		C	1445	69	.9	
RAMY	25	1453	1454	1506	N20	E29	.526		27.8	13	SF	3	C		29		
HOLL	25	1508	1513	1525	N02	W43	.682		28.9	17	SF	3	C		23		
RAMY	25	1532	1532	1600	N07	E79	.980		31.6	28	SF	3	C				
RAMY	25	1533	1555	1555D	N02	W43	.682		28.9	22D	1B	3	C		379		
RAMY	25	1537	1539	1548	S07	E01	.032		25.7	11	SF	3	C		32		
HOLL	25	1549	1555	1629	N02	W44	.695		29.0	40	1N	3	C		398		
RAMY	25	1621	1641	1655	N20	E27	.500		27.7	34	SF	3	C		63		
RAMY	25	1621	1624	1639	N09	E73	.953		31.2	18	SF	3	C		19		
RAMY	25	1654	1655	1705	N09	E73	.953		31.2	11	SF	3	C		10		
HOLL	25	1736	1750	1759	N01	W44	.696		29.0	23	SF	3	C		18		
HOLL	25	1801	1810	1826	N02	W46	.720		29.2	25	SN	3	C		51		
HOLL	25	1821	1821	1828	N19	E25	.467		27.6	7	SN	3	C		42		
HOLL	25	2048	2052	2129	N02	W47	.732		29.4	41	SB	3	C		108		
HOLL	25	2053	2058	2106	S11	W08	.168		26.5	13	SF	3	C		34		
HOLL	25	2142	2142	2149	N02	W48	.743		29.5	7	SN	3	C		28		
HOLL	25	2243	2246	2310	N01	W49	.756		29.6	27	SN	3	C		71		
HOLL	25	2323	2324	2339	S16	E79	.978		31.9	16	SF	3	C				
LEAR	26	0210	0213	0244	N01	W50	.767		29.8	34	SN	3	C		108		
PALE	26	0217E	0217U	0300D	S01	W46	.721		29.5	43D	SN	1	C		80		
PEKG	26	0220	0228	0305	S01	W53	.800		30.1	45	1N		P	0228	260	4.4	F
PEKG	26	0323	0325	0410	S03	W53	.798		30.1	47	SN		P	0325	63	1.1	D
LEAR	26	0451	0452	0459	S13	E73	.952		31.7	8	SF	3	C		43		
MANI	26	0625E	0625U	0629D	S12	E84	.993		1.6	4D	SN	2	C		15		
LEAR	26	0812	0818	0825	S13	E76	.967		1.0	13	1F	3	C				
LEAR	26	0949	0950	0953	N00	W55	.821		30.5	4	SF	3	C		17		
MONT	26	1001	1024	1047	N15	W52	.787		30.3	46	SN		C	1024	150		L
HOLL	26	1825	1835	1838	S13	E74	.957		1.3	13	SN	3	C				
HOLL	26	1917	1918	1922	S13	E74	.957		1.4	5	SF	3	C				
HOLL	26	1927	1927	1932	S09	E60	.862		31.3	5	SF	3	C		18		
HOLL	26	1955	2000	2009	N08	W71	.942		1.2	14	SF	3	C				
HOLL	26	2023	2028	2039	S14	E34	.567		29.4	16	SF	3	C		22		
LEAR	27	0205	0205	0211	S15	E75	.962		1.7	6	SF	3	C				
PALE	27	0217	0218	0220	S11	E65	.902		1.0	3	SF	1	C		18		
LEAR	27	0217	0217	0221D	S12	E66	.909		1.0	4D	1F	3	C		136		
MANI	27	0220E	0222U	0225D	S12	E67	.916		1.1	5D	SF	3	C		80		
MANI	27	0223E	0223U	0228D	S14	E32	.539		29.5	5D	SF	3	C		40		
MANI	27	0530E	0532U	0545D	S13	E30	.507		29.5	15D	SN	3	C		110		
LEAR	27	0535	0537	0555	S14	E28	.482		29.3	20	SF	3	C		27		
LEAR	27	0617	0618	0628	S16	E74	.957		1.8	11	SF	3	C				
LEAR	27	0617	0625	0645	S15	E28	.486		29.4	28	SF	3	C		34		
LEAR	27	0637	0638	0645	N02	W66	.913		1.2	8	SF	3	C		24		
LEAR	27	0638	0647	0658	S15	E73	.952		1.8	20	SF	3	C		15		
LEAR	27	0641	0645	0704	S10	E56	.825		31.5	23	SF	3	C		47		
LEAR	27	0705	0706	0712	S13	E65	.902		1.2	7	SF	3	C		35		
LEAR	27	0723	0727	0734	S13	E64	.894		1.1	11	SN	3	C		99		
PURP	27	0727	0728	0732	S13	E65	.902		1.2	5	SN		C	0728	72	1.6	
HOLL	27	1422E	1429U	1500	S14	E22	.394		29.2	38	SN	3	C		50		
HOLL	27	1619	1745	1822	S13	E64	.894		1.5	123	SB	3	C		283		
HOLL	27	1710E	1724	1751	S09	E47	.728		31.2	41	SF	3	C		26		
HOLL	27	1952	1952	2003	N11	E51	.774		31.7	11	SF	3	C		16		
HOLL	27	1952	2000	2031	S09	E44	.691		31.1	39	SN	3	C		29		
HOLL	27	2011	2012	2019	N21	E29	.530		30.0	8	SF	3	C		50		
HOLL	27	2026	2052	2217	S13	E19	.344		29.3	111	SN	3	C		96		
HOLL	27	2044	2046	2109	S11	W33	.546		30.3	25	SF	3	C		64		
HOLL	27	2109	2116	2137	S13	E61	.870		1.5	28	2B	3	C		509		
PALE	27	2111	2116	2130	S13	E54	.806		31.9	19	1N	2	C		180		
HOLL	27	2159	2209	2219	S13	E53	.796		31.9	20	SN	3	C		116		

Hα SOLAR FLARES

JANUARY 1982

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IM-POR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DAY	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	HALE PLAGE REGION	CMP. DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
PALE	27	2209E	2210U	2222D	S10	E55	.815		1.0	13D	SN	2	C		100		
HOLL	27	2243	2255	2310	S12	E52	.785		31.8	27	1B	3	C		237		
PALE	27	2247E	2249U	2306D	S13	E53	.796		31.9	19D	SB	2	C		115		
PURP	28	0128	0128	0310	S13	E17	.314		29.3	102	SN		C	0128	46	.5	E
PURP	28	0305E	0305	0310	S13	E52	.785		1.0	5	SB		V	0305	105	1.7	
PURP	28	0445	0446	0454D	S13	E52	.785		1.1	9D	SN		C	0446	111	1.8	E
PURP	28	0526	0527	0543	S15	E52	.787		1.1	17	SN		C	0527	124	1.9	
PURP	28	0643E	0645	0704	S12	E53	.795		1.3	21	2B		C	0645	655	10.9	H
PURP	28	0649	0708	0721	N07	E46	.716		31.7	32	3B		C				
PURP	28	0649	0700	0721D	N07	E46	.716		31.7	32D	3B		C	0708	917	14.0	KWH
PURP	29	0220E	0222	0234	S17	E49	.757		1.8	14	1B		C	0222	255	4.0	
PURP	29	0227E	0227	0302	S14	E39	.632		1.0	35	SB		C	0227	52	.7	E
PURP	30	0029	0033	0048D	N08	E44	.691		2.3	19D	SB		C	0033	105	1.4	E
PURP	30	0030	0033	0048D	N11	E30	.501		1.3	18D	SB		P	0033	124	1.4	E
PURP	30	0045	0046	0048D	S12	E29	.489		1.2	3D	SB		P	0046	111	1.3	E
PURP	30	0248	0248	0301	N11	W14	.255		31.2	13	SN		V	0248	92	1.0	E
PURP	30	0326	0329	0336	N07	E28	.467		1.2	10	SN		C	0329	52	.6	E
MONT	30	0824	0826	0830	N15	W19	.355		31.8	6	SN		C	0826	100		
PEKG	31	0020E	0020U	0135	S13	E08	.184		31.6	75	2N		P	0020	925	9.7	BFI
PEKG	31	0153	0156	0156D	S11	E16	.286		1.3	3D	SF		C	0156	101	1.1	F
PEKG	31	0156E	0156	0156D	S10	E03	.088		31.3		SN		P	0156	151	1.6	F
PEKG	31	0510	0525	0550	N10	E14	.249		1.3	40	1F		C	0525	421	4.6	FI
PEKG	31	0630	0632	0645	N10	E15	.265		1.4	15	1F		C	0632	252	2.8	E
PEKG	31	0707	0718	0742	N10	E13	.233		1.3	35	1F		C	0718	421	4.6	F

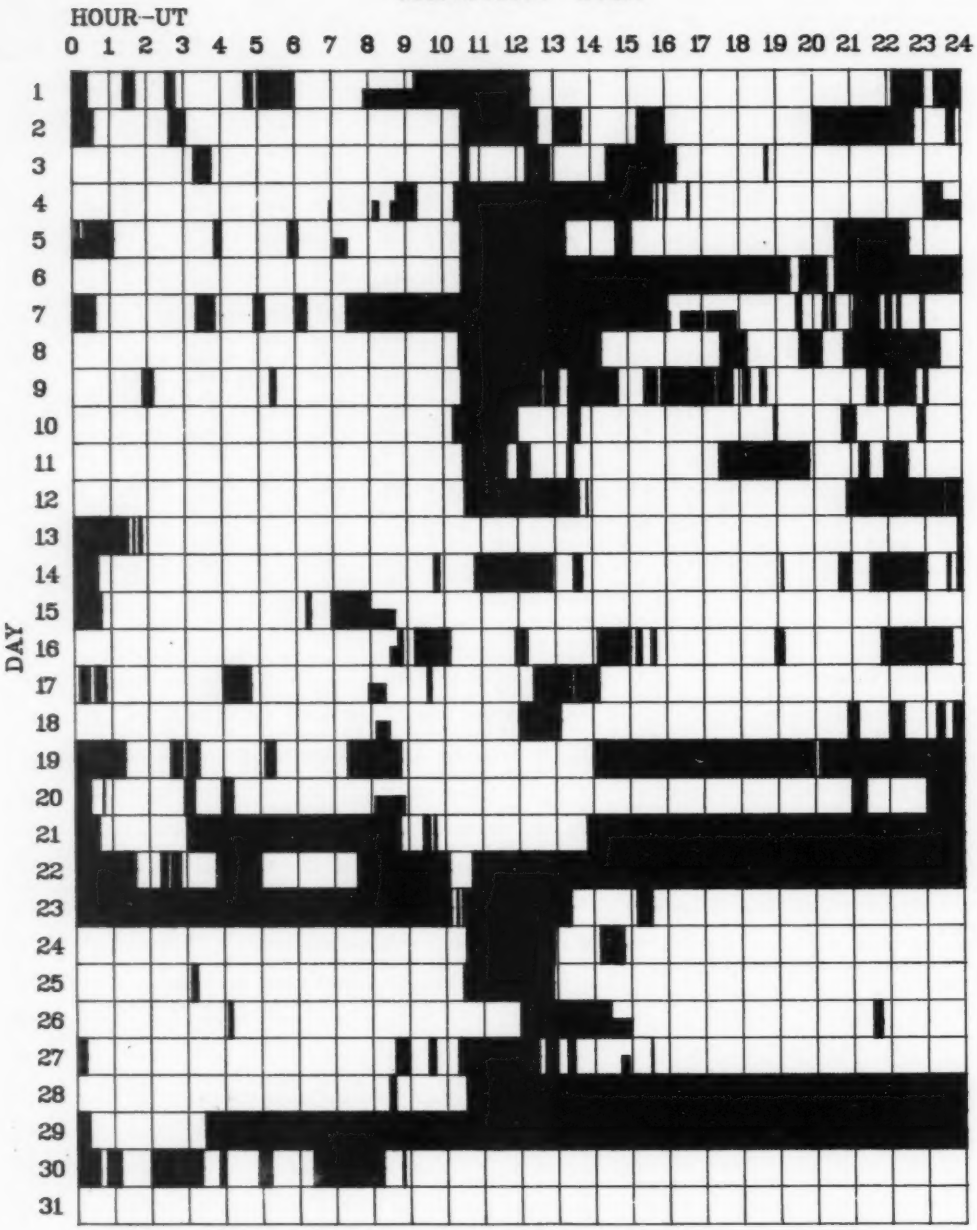
"REMARKS":

A = Eruptive prominence whose base is less than 90° from central meridian.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No visible spots in the neighborhood.
H = Flare accompanied by high-speed dark filament.
I = Active region very extended.
J = Distinct variations of plage intensity before or after the flare.
K = Several intensity maxima.
L = Existing filaments show signs of sudden activity.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the H and K lines of CaII.
P = Flare shows helium D3 in emission.
Q = Flare shows Balmer continuum in emission.
R = Marked asymmetry in H-alpha line suggests ejection of high-velocity material.
S = Brightness follows disappearance of filament in same position.
T = Region active all day.
U = Two bright branches, parallel or converging.
V = Occurrence of an explosive phase: important, expansion within roughly 1 minute that often includes a significant intensity increase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide H-alpha line.
Y = System of loop-type prominences.
Z = Major sunspot umbra covered by flare.

INTERVALS OF NO FLARE PATROL OBSERVATION

FOR PRECEDING SOLAR FLARE TABLE

JANUARY 1982



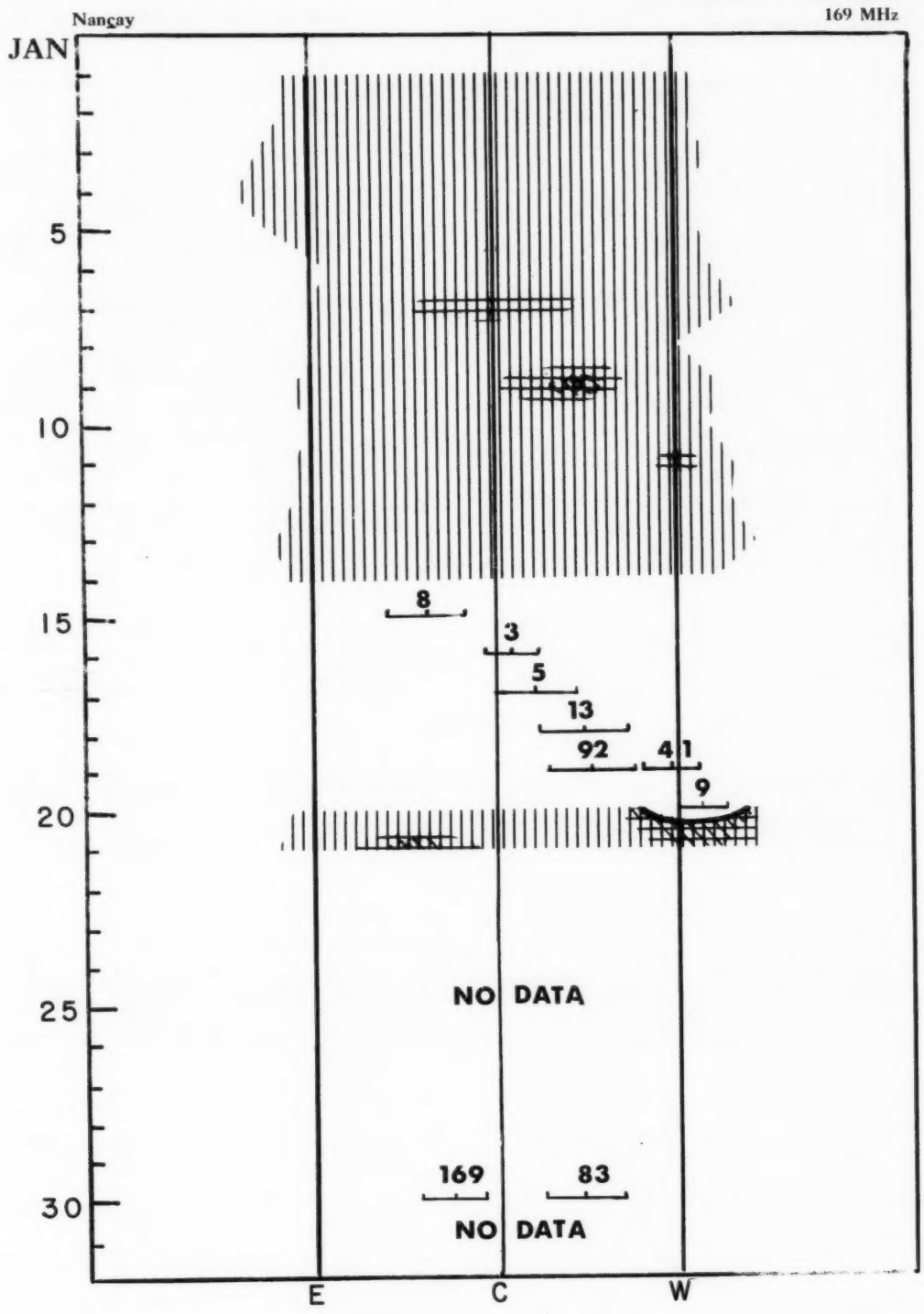
Observatories included in total patrol:

Bucharest	Istanbul	Palehua	Ramey	Wendelstein
Holloman	Learmonth	Purple Mt.		

Times of no flare patrol are shown by the shaded area for each day divided into times of no cinematographic patrol (bottom half of day) and times of neither visual nor cinematographic patrol (top half of day).

SOLAR RADIO EMISSION
INTERFEROMETRIC OBSERVATION

JANUARY 1982



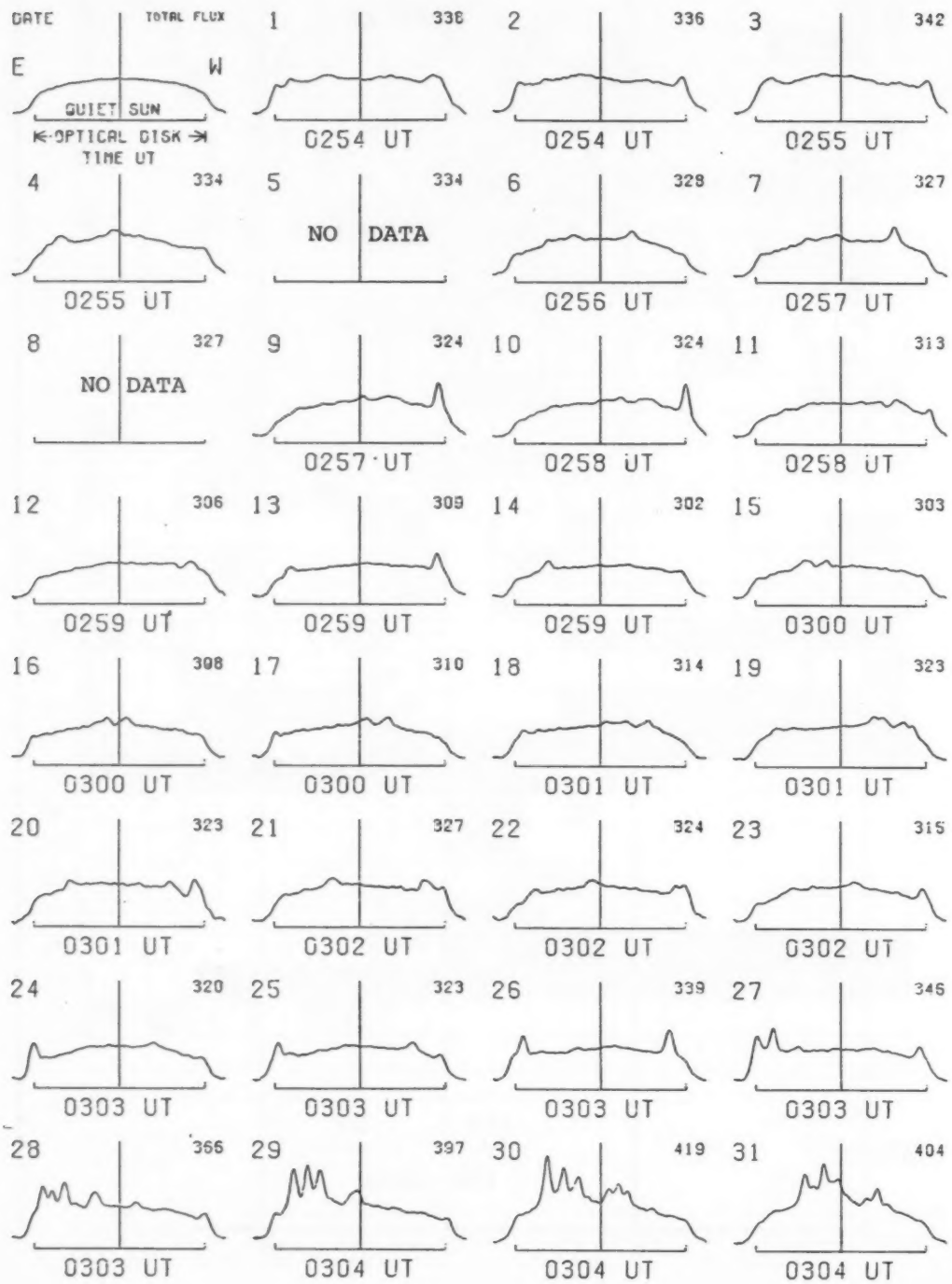
EAST-WEST SOLAR SCANS

JANUARY 1982

TOYOKAWA, JAPAN

3 CM

FAN BEAM WITH 1.1 MINUTES OF ARC

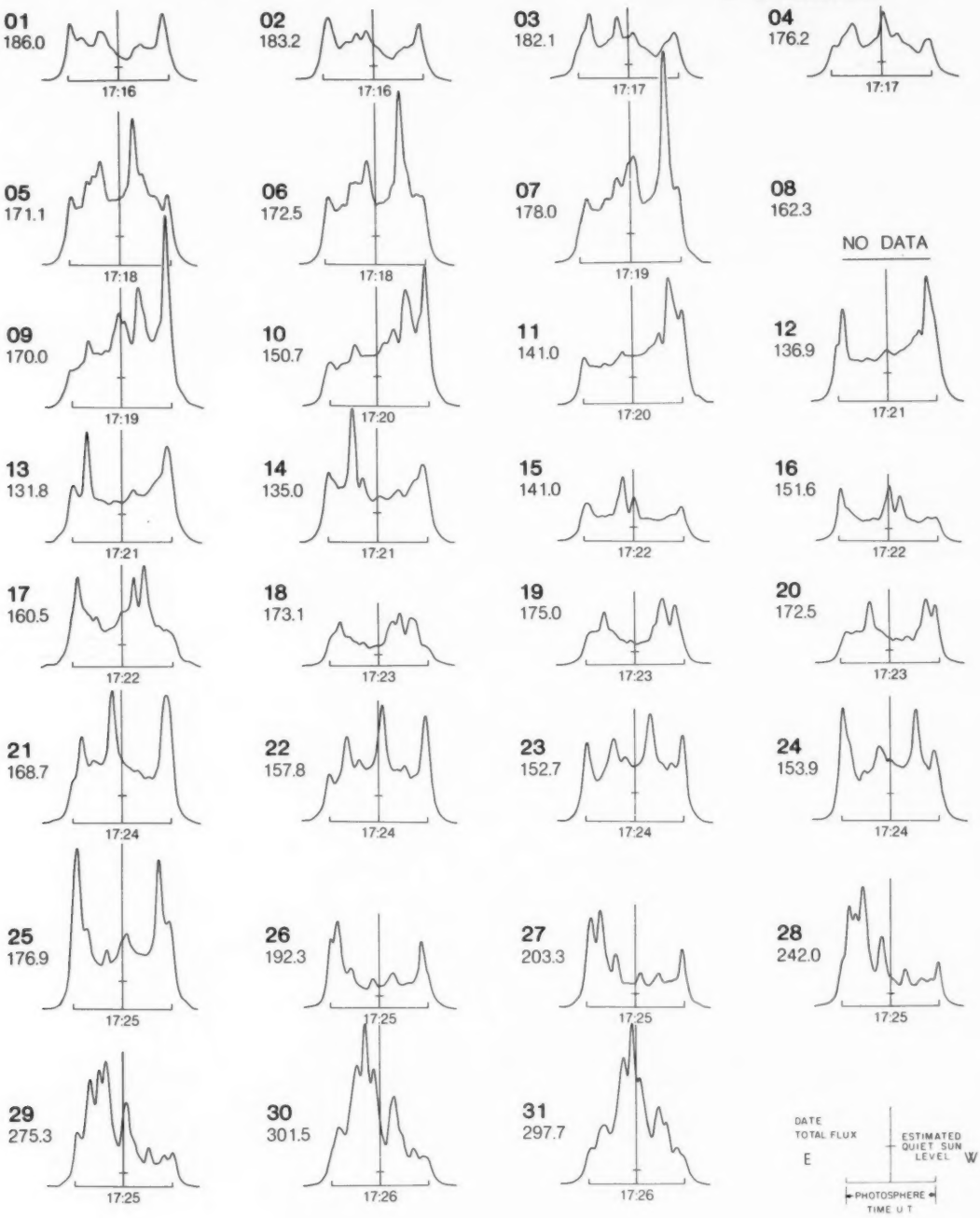


EAST-WEST SOLAR SCANS

JANUARY 1982

ALGONQUIN RADIO OBSERVATORY
CANADA

10·7 cm
Fan Beam with 1·5 minutes of arc
E-W Resolution

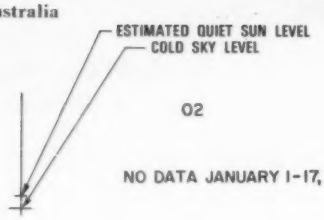


EAST-WEST SOLAR SCANS

JANUARY 1982

Fleurs, Australia

21 cm
Fan-Beam with 2 minutes of arc
E-W Resolution



01 02 03 04

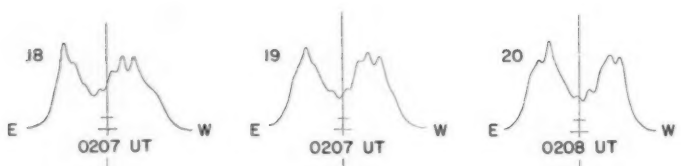
NO DATA JANUARY 1-17, 1982

05 06 07 08

09 10 11 12

13 14 15 16

17 18 19 20



21 22 23 24

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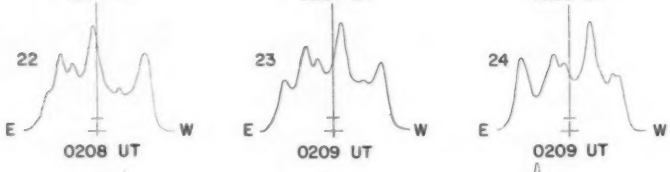
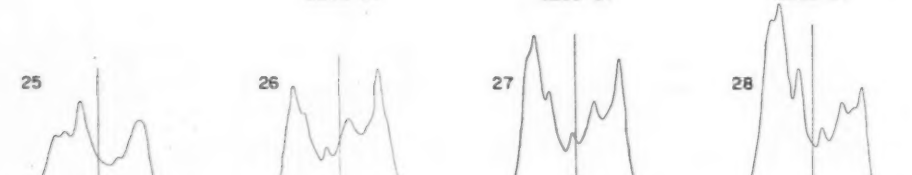


25 26 27 28



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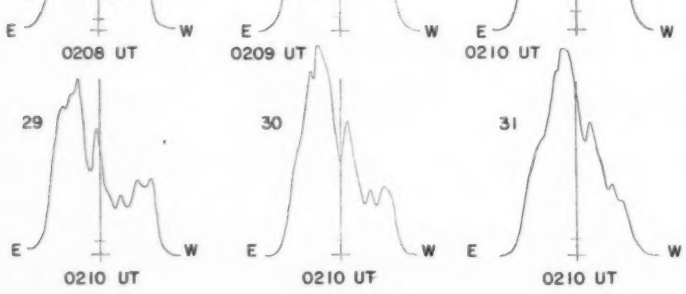
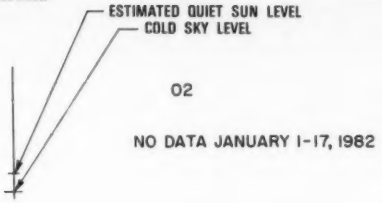


EAST-WEST SOLAR SCANS

JANUARY 1982

Fleurs, Australia

43 cm
Fan-Beam with 4 minutes of arc
E-W Resolution



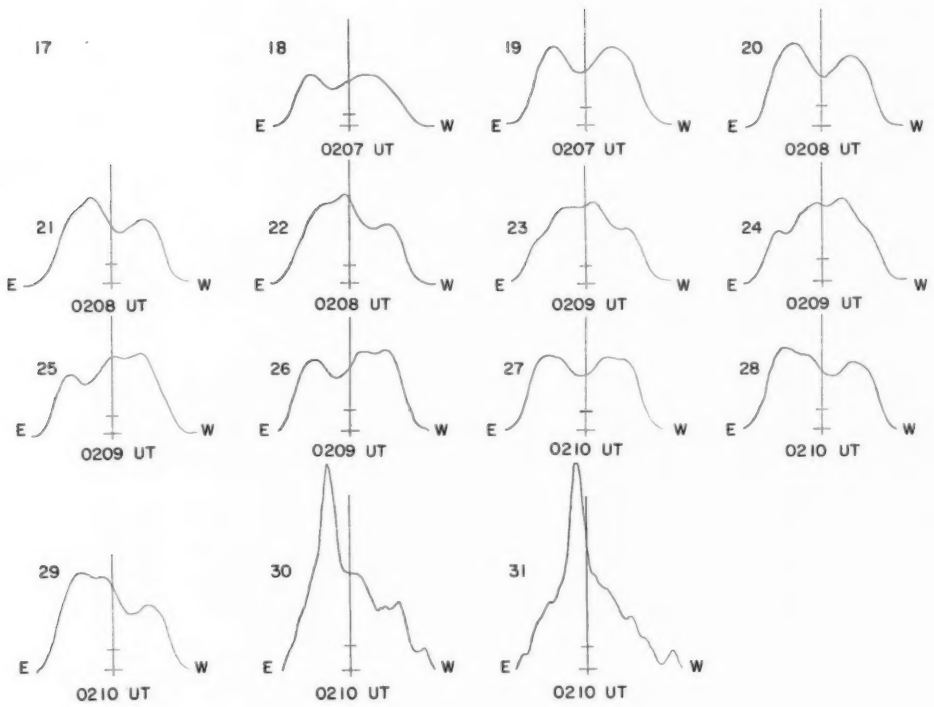
01 02 03 04

NO DATA JANUARY 1-17, 1982

05 06 07 08

09 10 11 12

13 14 15 16



SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

JANUARY 1982

DAY OF MONTH	FREQUENCY	STATION	TYPE		STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} MEAN	INT	REMARKS
01	8800	PALE	47	GB	0054.5	0057.3	12.0	480			
	2695	LEAR	47	GB	0055.0	0057.1	10.6	180			
	2695	MANI	4	S/F	0055.0	0057.8	9.0	118.0	39.3		
	8800	LEAR	47	GB	0055.1	0057.1	12.9	430			
	2695	PALE	47	GB	0055.3	0057.3	8.2	160			
	8800	MANI	4	S/F	0056.0	0057.8	7.0	26.3	8.8		
	2695	LEAR	20	GRF	0129.6	0132.8	5.9	23			
	2695	MANI	3	S	0130.0	0133.0	9.0	18.9	6.3		
	8800	MANI	3	S	0130.0	0134.0	8.0	56.4	18.8		
	2800	OTTA			1348.0	1353	12.00	10.8			
	2800	OTTA	1	S	1643.3	1643.8	3.0	2.6	1.3		
	8800	SGMR	20	GRF	1738.8	1743.1	6.2	30			
	2800	OTTA	20	GRF	1925.0	1932	30.0	2.8	1.4		
	2800	OTTA	3	S	2105.5	2108.5	9.5	10.8	5.0		
	8800	PALE	47	GB	2108.1	2109.1	6.4	76			
	2695	PENT	29	PRI	2115.0	2115	25.0	3.6	1.8		
02	8800	PALE	4	S/F	0044.3	0045.0	3.5	37			
	2695	LEAR	8	S	0044.5	0045.0	1.6	68			
	8800	LEAR	4	S/F	0044.5	0045.0	2.6	30			
	2695	MANI	4	S/F	0608.8	0610.2	6.2	117.0	39.0		
	8800	MANI	47	GB	0609.0	0610.1	5.0	928.8	309.6		
	8800	LEAR	49	GB	0609.0	0611.1	14.3	720			
	8800	ATHN	49	GB	0609.0	0611.3	5.0	890			
	2695	LEAR	47	GB	0609.1	0611.1	14.2	130			
	2695	ATHN	47	GB	0609.1	0611.3	5.0	90			
	2800	OTTA	20	GRF	1600.0	1630	55.0	2.2	1.1		
	2800	OTTA	20	GRF	1710.0	1755	110.0	2.2	1.1		
03	2695	LEAR	47	GB	0012.0	0018.5	6.6	63			
	8800	LEAR	4	S/F	0012.1	0018.3	7.7	13			
	2695	MANI	4	S/F	0017.6	0019.0	2.4	26.6	26.6		
	2800	OTTA	20	GRF	1435.0	1510	100.0	3.8	2.7		
	2800	OTTA	21	GRF	1448.0	1456	50.0	9.6	6.2		
	2800	OTTA	40	F	1452.5	1453.6	2.0	16.8			
04	2695	LEAR	8	S	0554.1	0554.5	.7	11			
	2800	OTTA	20	GRF	1930.0	2010	65.0	2.4	1.4		
	2695	PENT	1	S	2140.0	2142	8.0	3.0	1.5		
06	2800	OTTA	21	GRF	1945.0	2035	95.0	4.8	2.4		
	2695	PENT	1	S	1959.0	2002	5.0	2.8	1.6		
	8800	LEAR	8	S	2318.8	2319.1	1.2	08			
07	8800	LEAR	4	S/F	0232.3	0234.8	3.5	07			
	3200	BERN	3	S	1211.0	1216.9	17.0	16.0			
	2800	OTTA	21	GRF	1615.0	1650	120.0	4.6	2.6		
	2800	OTTA	1	S	1657.0	1657.3	1.5	9.0	3.0		
	8800	SGMR	8	S	1657.0	1657.1	.5	32			
	2800	OTTA	3	S	1937.5	1939	2.5	14.2	7.1		
	8800	SGMR	47	GB	1937.6	1938.6	4.2	61			
	2800	OTTA	29	PRI	1940.0	1940	8.0	3.4	2.0		
08	8800	PALE	47	GB	0202.1	0202.6	4.2	200			
	8800	LEAR	47	GB	0202.1	0202.6	2.4	189			
	2695	LEAR	8	S	0202.5	0202.6	.3	22			
	8800	LEAR	8	S	0943.3	0943.8	1.8	20			
	2695	LEAR	8	S	0943.6	0944.8	1.5	10			
	2800	OTTA	21	GRF	1400.0	1445	110.0	8.2	4.1		
	3200	BERN	3	S	1423.0	1427.9	20.00	31.0			
	2800	OTTA	3	S	1426.0	1428	5.0	15.4	6.0		
	8800	ATHN	4	S/F	1426.6	1428.6	4.0	21			
	8800	SGMR	4	S/F	1427.0	1428.3	23.0	34			
	8400	BERN	3	S	1427.4	1428.3	7.0U	21.0			
	2695	ATHN	4	S/F	1427.6	1428.1	3.4	17			
09	2695	MANI	3	S	0530.0	0532.7	5.0	13.0	4.3		
	8800	ATHN	20	GRF	0729.0	0734.6	14.3	44			
	2695	MANI	3	S	0730.7	0735.1	7.1	33.1	11.0		
	8800	MANI	3	S	0732.5	0735.1	5.0	44.8	14.9		
	8800	LEAR	4	S/F	0732.8	0734.6	11.2	30			
	2695	ATHN	20	GRF	0732.8	0734.8	10.5	32			
	2695	LEAR	4	S/F	0733.0	0734.6	10.8	40			
	8400	BERN	3	S	1124.0	1125.5	3.0U	39.0			
	8800	ATHN	4	S/F	1124.0	1125.5	5.1	34			
	3200	BERN	3	S	1124.0	1125.5	9.0D	15.0			
	3200	BERN	3	S	1410.0	1411.4	3.0	14.0			
	8800	SGMR	4	S/F	1410.5	1411.1	16.5	48			
	8800	ATHN	4	S/F	1410.5	1411.3	2.5	37			
	8400	BERN	3	S	1410.9	1411.4	3.0	35.0			
	2800	OTTA	20	GRF	1417.0	1417	155.00	11.8			
10	2800	OTTA	1	S	2036.0	2037	2.0	3.4	1.7		
	2800	OTTA	1	S	2040.1	2040.6	1.0	8.4	4.2		

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

JANUARY 1982

DAY OF MONTH	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	REMARKS
10	2800	OTTA	8 S	2041.7	2042	.6	2.0			
	2695	PENT	8 S	2209.3	2209.5	.7	2.4	1.0		
13	2695	LEAR	47 GB	0128.8	0133.6	10.3	169			
	8800	LEAR	47 GB	0129.6	0134.3	9.4	100			
	8800	PALE	4 S/F	0130.3	0134.3	17.3	100			
	8800	MANI	4 S/F	0132.0	0134.6	6.0	86.0	28.7		
	2695	MANI	4 S/F	0132.0	0134.2	7.5	180.4	60.1		
	2695	PALE	4 S/F	0133.3	0133.6	14.3	92			
15	2800	OTTA	1 S	1829.0	1829.9	1.5	7.2	3.6		
	2800	OTTA	29 PBI	1830.5	1830.5	5.0	2.2	1.1		
16	2800	OTTA	20 GRF	1820.0	1822.5	12.0	3.8	1.9		
	2800	OTTA	20 GRF	2010.0	2030	95.0	3.4	1.7		
17	2800	OTTA	20 GRF	1510.0	1530	45.0	2.4	1.4		
	2800	OTTA	20 GRF	1705.0	1730	115.0	3.4	2.6		
	2800	OTTA	20 GRF	1915.0	1950	105.0	6.6			
18	2695	MANI	3 S	0536.5	0538.0	2.5	23.7	7.9		
	2800	OTTA	21 GRF	1425.0	1442	80.0	5.6	2.5		
	2800	OTTA	2 S/F	1434.0	1435.1	1.5	6.2	4.2		
	2800	OTTA	21 GRF	1740.0	2030	250.0	13.2	9.8		
	2800	OTTA	2 S/F	1835.5	1836	1.5	3.8	1.4		
	2800	OTTA	1 S	2100.0	2100.2	1.2	3.8	1.9		
19	3200	BERN	3 S	0928.8	0929.6	2.0	15.0			ONLY PAPER REC
	2800	OTTA	22 GRF	1420.0	1530	130.0	5.6	2.4		
	8800	SGMR	4 S/F	1439.1	1439.3	2.9	23			
	2695	PENT	1 S	2154.0	2155	5.0	3.2	1.6		
20	2800	OTTA	240 R	1855.0	1855	35.0	6.2			
21	3200	BERN	3 S	0817.0	0820.5	6.0	21.0			ONLY PAPER REC
	8800	MANI	3 S	0818.5	0820.5	2.5	15.7	5.2		
	2695	MANI	3 S	0819.0	0820.5	3.0	11.8	3.9		
	2695	LEAR	4 S/F	0819.3	0820.3	1.00	18			
	8800	LEAR	4 S/F	0819.3	0820.3	1.00	20			
	2800	OTTA	20 GRF	1420.0	1445	110.0	3.0	1.5		
	2800	OTTA	27A RF	1810.0		180.0	2.8	2.6		
	2800	OTTA	24 R	1810.0	1815	5.0	2.8	1.4		
	2800	OTTA	24P R	1815.0		160.0	2.8			
	2695	PENT	20 GRF	1957.0	2000	13.0	2.0	1.0		
	2695	PENT	26 FAL	2055.0	2110	15.0	-2.8	-1.4		
22	2695	MANI	4 S/F	0441.5	0444.9	14.5	147.7	49.2		
	2695	LEAR	47 GB	0442.3	0444.5	2.20	180			
	8800	LEAR	49 GB	0442.6	0444.3	1.70	1300			
	8800	MANI	4 S/F	0442.8	0444.7	14.2	359.5	119.8		
	2800	OTTA	20 GRF	2000.0	2045	90.0	3.8	1.8		
24	2695	LEAR	47 GB	0152.1	0155.8	10.0	139			
	8800	LEAR	47 GB	0152.6	0155.8	8.4	54			
	2695	MANI	3 S	0153.5	0156.3	10.5	134.6	44.9		
	8800	PALE	47 GB	0153.8	0155.8	14.0	69			
	8800	MANI	3 S	0153.9	0156.4	6.1	92.0	30.7		
	2695	PALE	47 GB	0154.3	0155.8	7.2	139			
	8800	SGMR	4 S/F	1449.5	1450.1	2.3	46			
	2800	OTTA	22 GRF	1450.0	1455	15.0	3.4	1.7		
	2800	OTTA	1 S	1528.4	1529	2.0	2.2	1.1		
	2800	OTTA	23 GRF	1915.0	2000	220.00	24.0			
	2800	OTTA	8 S	1938.8	1938.9	.5	3.6	1.8		
	2800	OTTA	1 S	1941.0	1942	1.5	3.4	1.7		
	2800	OTTA	3 S	1944.0	1945	6.0	13.8	6.6		
25	2800	OTTA	20 GRF	1445.0	1530	250.0	5.6	2.8		
	8800	SGMR	8 S	1919.3	1919.5	.3	16			
	2800	OTTA	20 GRF	2046.0	2053	26.0	3.2	1.2		
26	8800	LEAR	20 GRF	0210.0	0219.8	21.6	13			
	2695	LEAR	20 GRF	0211.8	0220.8	19.8	08			
	8800	LEAR	20 GRF	0235.6	0236.1	14.4	10			
	2695	LEAR	20 GRF	0235.6	0236.3	9.4	09			
	2800	OTTA	20 GRF	1525.0		155.0	3.8	2.4		
27	2800	OTTA	20 GRF	1355.0	1430	65.0	3.8	1.9		
	2800	OTTA	240 R	1615.0	1650	35.0	3.8	1.9		
	2800	OTTA	8 S	1744.0	1744.1	.5	2.6			
	2695	PENT	240 R	1750.0	1800	10.0	3.0	1.5		
	2695	PENT	240AR	2111.0	2115	4.0	3.8			
	2695	PENT	2 S/F	2113.0	2114	2.5	9.4	4.4		
	2695	PENT	240AR	2209.0	2213	4.0	3.8	1.9		
	2695	PENT	8 S	2209.9	2210	.7	6.0	3.0		
	2695	PENT	4 S/F	2253.0	2253.8	2.0	38.0	22.0		

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

JANUARY 1982

DAY OF MONTH	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	REMARKS
27	2695	LEAR	8 S	2253.0	2253.6	1.8	48			
	8800	LEAR	47 GB	2253.1	2253.6	1.7	51			
	2695	MANI	3 S	2253.2	2254.4	2.3	47.5	15.8		
	8800	MANI	3 S	2253.2	2254.0	2.1	60.6	20.2		
28	2695	MANI	4 S/F	0658.5	0722.7	41.0	437.1	145.7		
	8800	MANI	47 GB	0659.0	0722.2	38.0	1470.1	490.0		
	3200	BERN	4 S/F	1113.0	1113.4	4.0	95.0			
	2800	OTTA	240AR	1353.0	1500	67.0	19.2			
	2800	OTTA	20 GRF	1422.0	1440	30.0	5.8	2.9		
	2800	OTTA	20 GRF	1510.0	1520	20.0	3.8	2.6		
	2800	OTTA	240 R	1635.0	1655	20.0	3.8	1.9		
	2800	OTTA	20 GRF	1930.0	1945	110.0	4.4			
29	2695	MANI	3 S	0312.5	0313.8	2.9	31.0	10.3		
	2800	OTTA	240 R	1400.0	1425	25.0	8.8			
	2800	OTTA	1 S	1502.0	1503.7	8.0	5.2	2.4		
	2800	OTTA	1 S	1539.0	1540.6	3.0	5.6	2.8		
	2800	OTTA	20 GRF	1730.0	1745	65.0	10.4	5.0		
	2695	PENT	240 R	2100.0	2112	12.0	4.4	2.2		
	2695	PENT	1 S	2125.0	2125.8	1.8	8.8	4.4		
	2695	PENT	1 S	2131.0	2132	3.0	4.8	2.0		
	2695	PENT	45 C	2148.0	2153	6.0	12.0	4.6		
30	2695	MANI	3 S	0606.4	0607.2	4.1	63.2	21.1		
	8800	MANI	3 S	0606.4	0607.2	1.6	111.6	37.2		
	3200	BERN	45 C	1130.0	1214.9	90.0	290.0			
	8400	BERN	21 GRF	1130.0	1214.7	90.0	150.0			
	2800	OTTA	8 S	1642.0	1642.2	.3	3.0	1.5		
	2800	OTTA	240 R	1700.0	1717	17.0	8.6			
	2800	OTTA	1 S	1755.0	1757	10.0	2.6	1.3		
	2800	OTTA	21 GRF	1820.0	1838	80.0	13.2	6.4		
	2800	OTTA	4 S/F	1824.0	1831	12.0	34.0	17.0		
	2695	PENT	1 S	2011.0	2012	6.0	4.4	2.2		
	2695	PENT		2124.0	2157	34.00	960.0			
	2695	MANI	47 GB	2333.5	0007.9	50.5	1332.0	444.0		
	8800	MANI	47 GB	2334.0	2351.7	44.0	1602.1	534.0		
31	8400	BERN	47 GB	1316.0	1331.00	70.0	1200.00			
	3200	BERN	45 C	1316.0	1331.0	70.0	461.0			
	2800	OTTA	4 S/F	1320.0	1331	15.0	352.0	84.6		
	2800	OTTA	29 PRI	1335.0	1335	195.0	21.0	10.5		
	2800	OTTA	1 S	1746.0	1747.8	3.0	5.2	2.6		
	2800	OTTA	21 GRF	1800.0	1840	70.0	7.8	3.9		
	2800	OTTA	3 S	1834.0	1836.1	6.0	46.0	14.0		
	2695	PENT	21 GRF	2140.0	2225	90.00	31.0			
	2695	PENT	46F C	2203.0	2206.3	14.0	66.0	29.0		

Observatories:

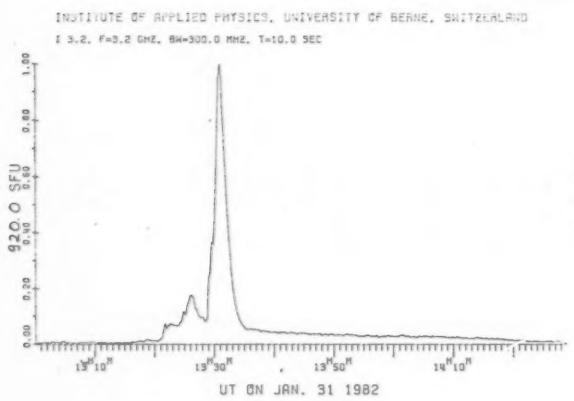
BERN = Berne MANI = Manila OTTA = Ottawa ARO PENT = Penticton SGMR = Sagamore Hill
LEAR = Learmonth ATHN = Athens PALE = Palehua

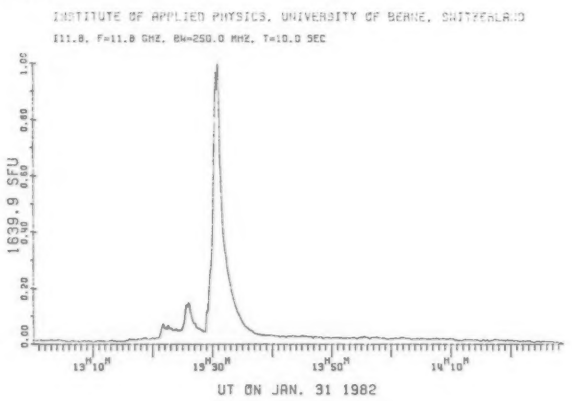
Explanation of Type Code:

1 Simple 1 — 6 Minor — 22 Simple 3F — 27 Rise and Fall — 32 Absorption — 44 Noise Storm in Progress
2 Simple 1F — 7 Minor + — 23 Simple 3AF — 28 Precursor — 40 Fluctuation — 45 Complex
3 Simple 2 — 8 Spike — 24 Rise — 29 Post Burst Increase — 41 Group of Bursts — 46 Complex F
4 Simple 2F — 20 Simple 3 — 25 Rise A — 30 Post Burst Increase A — 42 Series of Bursts — 47 Great Burst
5 Simple — 21 Simple 3A — 26 Fall — 31 Post Burst Decrease — 43 Onset of Noise Storm — 48 Major
49 Major +

SELECTED SOLAR NOISE BURSTS

JANUARY 31, 1982





PIONEER XII
Solar Wind

JANUARY 1982

DATE Jan '82	TIME (UT)	ESV (°)	U_{H+} (km/s)	N_{H+} (H^+/cc)	T_{H+} (x10^6 K)
1	0501	12.3	416.	5.4	0.014
2	0406		429.	17.9	.178
3	0306		358.	17.9	.09
4	0405		505.	13.3	.16
5	0339		554.	43.2	.181
6	0510		437.	18.5	.152
7	0348		457.	10.4	.228
8	0500		364.	28.	.019
9	0507		311.	51.1	.017
10	0502		300.	20.9	.037
11	0454		275.	86.4	.018
12	0618		264.	68.2	.022
13	0506		311.	40.1	.139
14	0449		367.	34.4	.177
15	0458	3.9	367.	36.1	.177
16	0335		381.	19.6	.092
17	0358		381.	22.2	.137
18	0446		367.	17.3	.105
19	0620		315.	37.2	.014
20	0505		363.	46.5	.068
21	0431		491.	12.2	.094
22	0411		486.	15.2	.119
23	0547		558.	17.	.263
24	0545		564.	11.3	.185
25	0531		442.	8.1	.168
26	0550		416.	33.1	.142
27	0432		369.	69.6	.029
28	0543		436.	65.4	.063
29	0559		596.	23.2	.379
30	0604		545.	5.4	.175
31	0459		464.	2.3	.047

INFERRED IP MAGNETIC FIELD

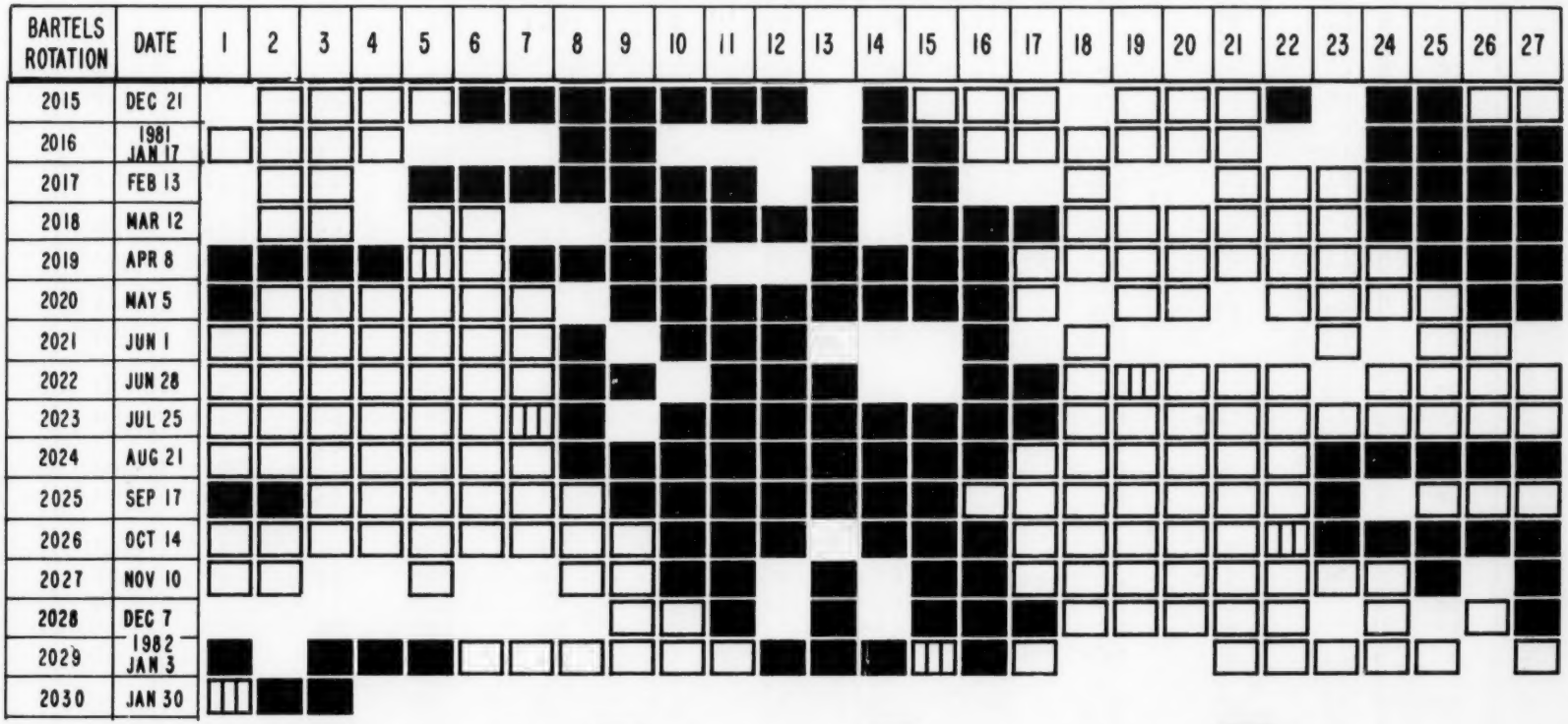
BARTELS ROTATION	DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
2009	JUL 17		-	AT		-						-			TA	TA		-		AT	AT			-		-		-	-	A*	-	-	
2010	AUG 13		AT					-	AT	-						-		-	AT					TA			-	A*				
2011	SEP 9							TA		AT					TA		TA										TA					
2012	OCT 6							*			TA		TA			A*							TA			TA					
2013	NOV 2	AT					TA	TA				AT	A*									-	TA	-	AT			TA				
2014	NOV 29				-						-		-		TA		TA	TA		AT			AT			-			TA			
2015	DEC 26										-		-			-	TA	-	TA	-		-		-			AT		AT		-		-
2016	1981 JAN 22	TA	-		AT	T*			-		AT	TA				TA						-					AT					TA	
2017	FEB 18			AT		TA								TA		TA		*							AT			TA			TA	
2018	MAR 17								AT						-					TA				AT		-	-			TA		AT	
2019	APR 13	TA		-		-					-					TA				*	AT	-			-			AT		-		-	
2020	MAY 10	-	-	-	-	TA	AT		TA			-			TA								*		*								
2021	JUN 6			*							AT				TA			AT			-	-	-	-	-		-		-		-		-
2022	JUL 3		-		-		-		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2023	JUL 30		-	-	-	-	-		-		-		-	-	-	-	-	-	-	-	TA	-	TA	-	-		-		-		-	-	-
2024	AUG 26	-	-		-		-	TA	-	TA	-		-	TA	-		-	TA	-		-		-		-		-	TA	-		-		-	
2025	SEP 22		-		-		-		-		-		-	TA	-		-	TA	-	TA	-		-	TA	-	AT	-	TA	-	AT	-	TA	-	TA	-
2026	OCT 19	AT	-	TA	-	TA	-		-		-		-		-		-	TA	-		-		-	AT	-	TA	-		-		-		-
2027	NOV 15		-		-		-	AT	-	AT	-		-		-		-	TA	-	TA	-	AT	-		-		-		-	AT	-		-
2028	DEC 12	TA	-		-		-		-	AT	-	TA	-		-		-	AT	-	AT	-	TA	-		-		-	TA	-		-	-	-
2029	1982 JAN 8		-		-		-		-	TA	-	TA	-		-		-	TA	-		-		-	AT	-		-		-	-	-	-	-

[ ] = definitely towards the sun [ ] = definitely away from the sun

T = towards the sun A = away from the sun * = effect doubtful or not discernible - = missing data

The table shows daily inferences of the polarity of the interplanetary magnetic field. The first half of the day is based principally on magnetograms produced by the magnetometer at the Vostok Antarctic Station of the USSR. The magnetometer of the U.S. Air Weather Service now operated at Thule by the Danish Meteorological Institute is used for the second half of the day. The Thule magnetometer ceased operating in August 1981.

STANFORD MEAN SOLAR MAGNETIC FIELD



POLARITY OF THE MEAN SOLAR MAGNETIC FIELD: □ = FIELD >2μT, ▥ = -2μT ≤FIELD ≤2μT, ■ = FIELD <-2μT

No box visible indicates no data available for that day.

NOTE: Data are taken daily at 2000 UT. Dates given are not Bartels Rotation dates. These earlier dates correspond to the occurrence of phenomena on the Sun that affect the Earth during the given Bartels Rotation.

STANFORD MEAN SOLAR MAGNETIC FIELD (MICROTESLA)

day	1981 FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	1982 JAN.
01	33	.	75	2	16	53	-49	-134	-27	94	41	15
02	20	54	82	-51	21	49	.	-87	11	82	34	-6
03	64	.	31	-66	17	41	-72	-56	70	55	49	-17
04	72	.	-23	-56	6	14	-80	-21	104	-1	-3	.
05	58	102	-67	-24	28	-17	-67	-7	115	-19	.	-10
06	28	81	-85	23	33	-62	-48	11	104	-36	-12	-5
07	.	39	-97	25	3	.	-33	26	28	-29	.	-4
08	.	-11	-76	36	-27	-93	-26	30	25	-23	.	25
09	-6	-28	-40	45	.	-56	-19	33	-7	-16	.	23
10	-24	-50	-28	49	-96	-43	-7	32	.	11	.	36
11	-42	-58	-7	35	-75	.	16	4	8	34	.	45
12	-26	.	0	.	-58	.	58	-29	32	.	.	35
13	.	18	13	-76	.	-9	68	-47	43	.	.	16
14	15	35	-6	-147	.	-7	81	-37	64	105	.	-7
15	24	.	-29	-131	.	9	68	-24	103	.	57	-6
16	.	37	-61	-94	-3	0	49	-32	115	.	17	-12
17	-8	12	-73	-50	.	38	49	-24	167	48	-5	-1
18	-19	.	.	-47	50	59	42	-8	218	3	.	-3
19	-62	.	.	-53	.	66	16	11	193	-28	-37	33
20	-65	-41	-85	-41	.	.	12	85	115	-45	.	.
21	-76	-91	-79	13	.	108	31	135	65	.	-39	.
22	-70	-119	-86	.	.	107	38	124	9	-65	-11	.
23	-68	-120	-51	72	59	73	52	60	-62	.	-2	9
24	.	-102	5	61	.	34	67	6	-107	-43	35	25
25	-75	.	43	.	29	29	92	-79	-128	-20	4	35
26	.	-88	70	126	18	34	64	-115	.	58	39	42
27	-8	-52	67	109	.	28	15	-138	-61	83	17	36
28	.	-20	84	50	44	33	-12	-144	-60	96	29	.
29		31	122	24	62	43	-64	-121	-19	59	.	15
30		45	61	-9	50	38	-84	-75	67	55	24	0
31		55		-4		1	-143		87		.	-10

DOT SYMBOL INDICATES NO DATA AVAILABLE FOR THE DAY.

BOULDER GEOMAGNETIC SUBSTORM LOG

JANUARY 1982

DATE	ONSET TIME	DIR	COMMENTS
01/01	1220		Weak SS
	1530		Slow onset.
01/02			Field unsettled after 1000 UT with no distinctive SS activity.
01/03			Field unsettled after 0600 UT.
	0850	West	
	1445		Slow onset.
	1555		Injection into existing SS.
01/04			Field intermittently unsettled.
	1255		Localized weak SS, College to Ft. Yukon.
	1530		Slow expansion northward and eastward from Ft. Yukon.
01/05	0930	West	Weak SS, otherwise quiet day.
01/06			Field intermittently unsettled.
	0805	≈ center	Several injections with recovery near 0930 UT.
01/07			Field unsettled.
	0750		Weak SS.
	1320		Localized SS, College to Ft. Yukon.
	1525		Localized SS vicinity College.
01/08			Field intermittently unsettled with no distinctive SS activity.
01/09			Field intermittently unsettled with no discinctive SS activity.
01/10			Quiet day.
01/11			Field slightly unsettled.
01/12			Quiet day.
01/13	0410		Weak positive impulse H-component all mid/low latitude stations. Field slightly unsettled balance of day.
01/14			Quiet day.
01/15			Field intermittently unsettled.
	0300		Marked bay at Boulder-Tucson only. Boulder in partial ring current sector.
	1030		Slow onset at College.
	1120		SS injection occurs in rest of oval stations. Numerous minor injections follow with field recovery near 1600 UT.
01/16	0750	West	Several injections with recovery near 1000 UT.
	1305	West	Moderate SS, slow onset, numerous injections with recovery near 1700 UT.
01/17	0825		Initial injection followed by numerous minor injections through 1700 UT.
01/18	1005		Weak SS, slow onset.
	1820	West	Moderate SS.
01/19			Quiet day.
01/20			Field slightly unsettled.
01/21			Field unsettled after 0600 UT.
	0735	≈ center	Several injections with recovery near 0930 UT.
	1655		
01/22			Field strongly active 0500-1830 UT.
	0515	East	
	0830	West	
	1055	West	
	1150	West	
	1605		
01/23	0450	East	
	1055	West	Weak SS.
	1150	West	
	1500	West	
01/24			Field unsettled all day.
	1250	West	Several injections with recovery near 1630 UT.
01/25			Field intermittently unsettled.
	1410		Weak SS.
01/26			Field slightly unsettled.
01/27			Field intermittently unsettled.
	1040	West	
	1255	West	
01/28	0240	East	Boulder in partial ring current sector.
	0740		Sharp onset at Sachs Harbour but slow onset at oval stations; followed by numerous injections with recovery near 1230 UT.
01/29	1705		Slow positive rise H-component all mid/low latitude followed by a very sharp negative impulse at 1740 UT. Field unsettled balance of day.
01/30			Field active 0500-1600 UT.
	0455	East	
	0750	West	
	0855	West	
01/31	0410	East	Minor magstorm conditions 1500-1830 UT.
	1415	West	Strong SS.

CORRECTION: The time of the SI on 29 December 1981 should be 0455 rather than 1255 UT.

SGD 450 Part I (Prompt)

DECEMBER 1981 DATA

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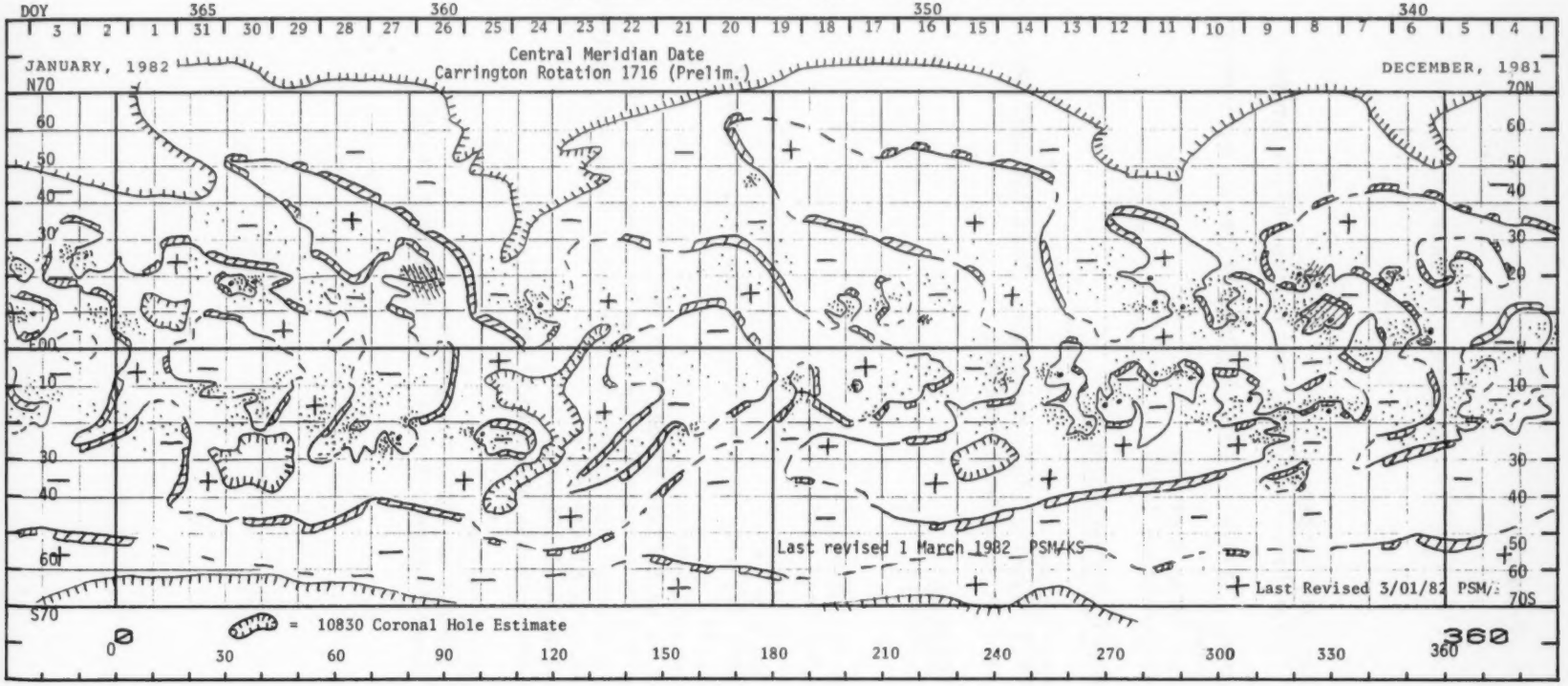
Hα SYNOPTIC CHART

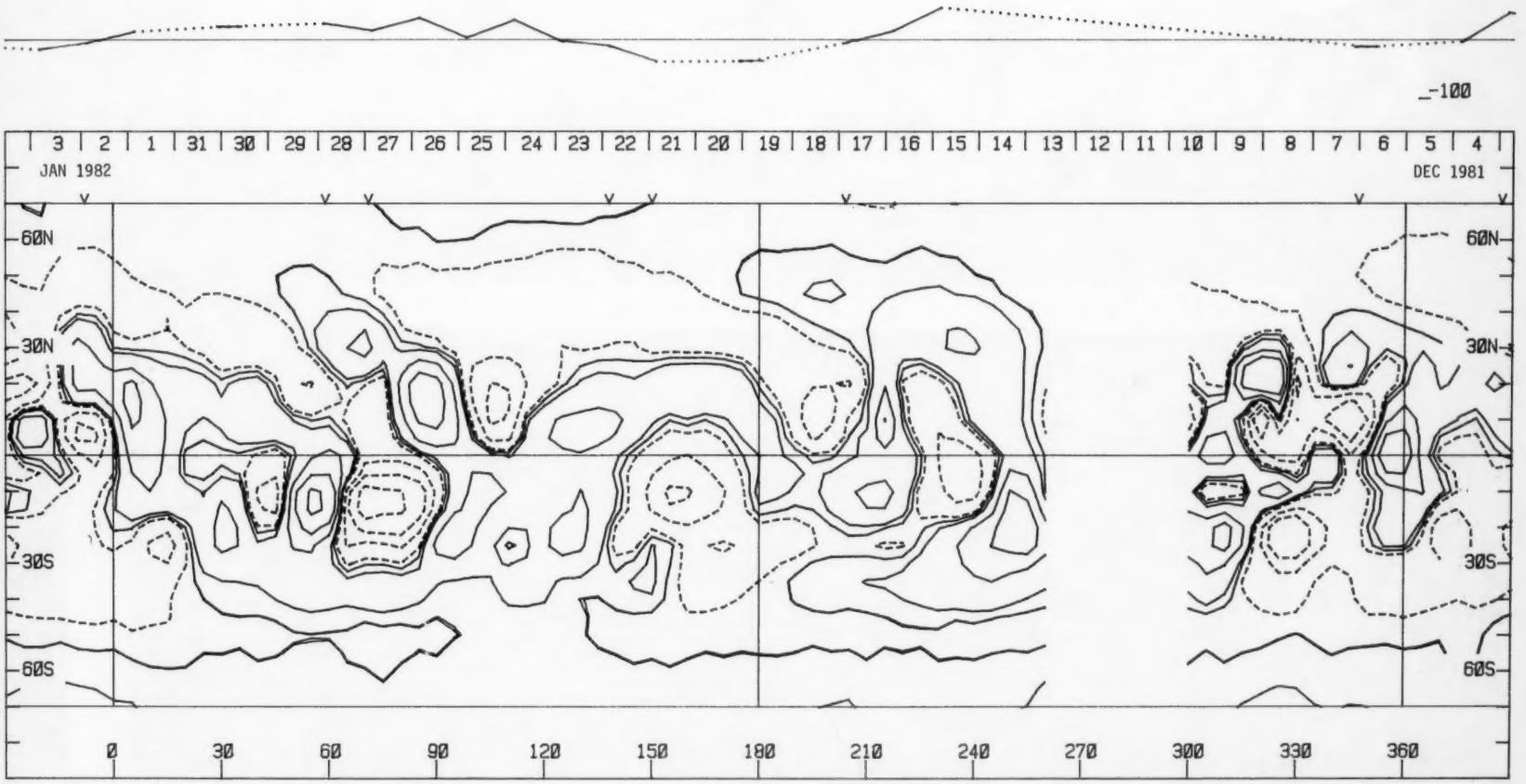
CARRINGTON ROTATION 1716 (PRELIMINARY)

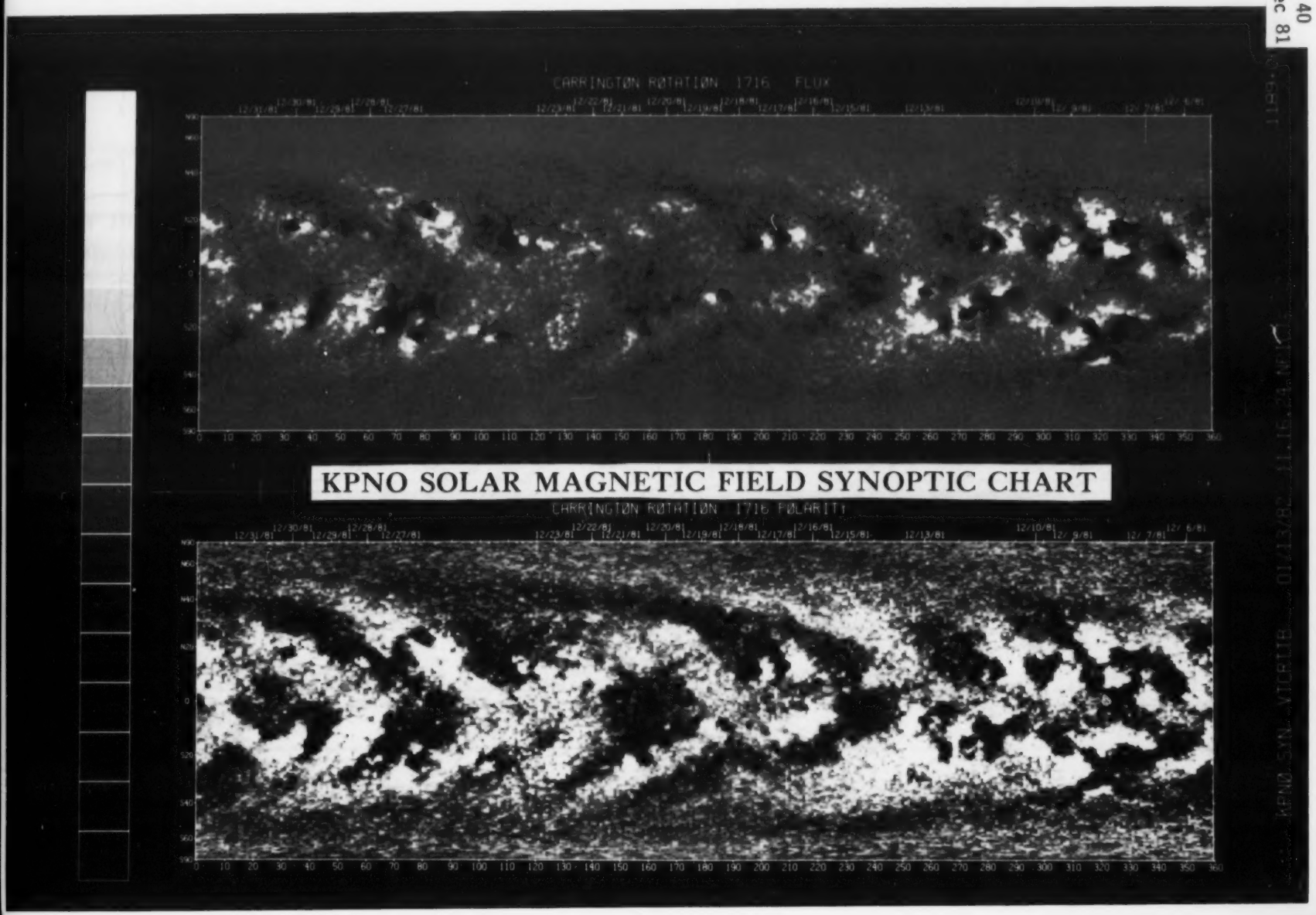


SOLAR MAGNETIC FIELD SYNOPTIC CHART
CARRINGTON ROTATION 1716

Stanford Solar Observatory

0,±100,200,500... μT

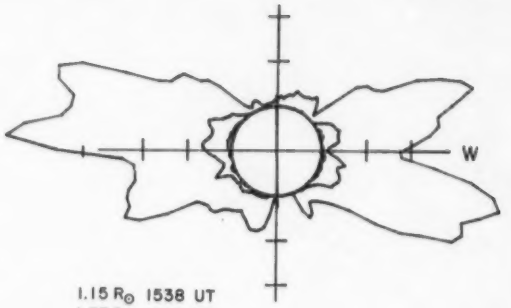




KPNO SOLAR MAGNETIC FIELD SYNOPTIC CHART

DECEMBER 1, 1981 (P=16.15, B_o= 0.86, L_o= 65.31)

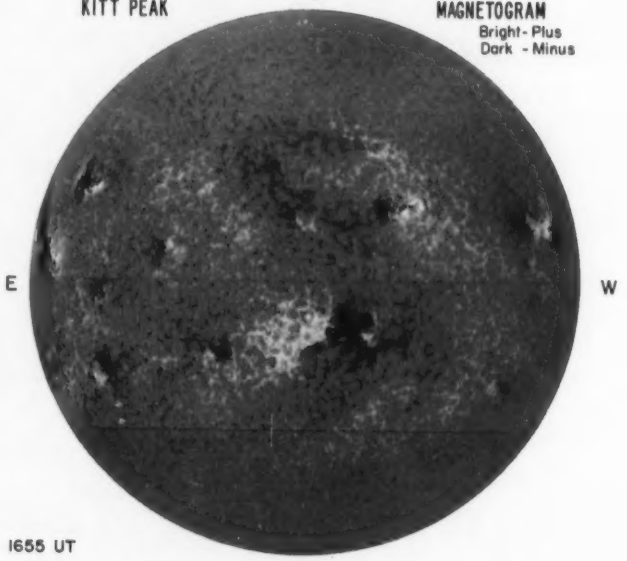
SACRAMENTO PEAK Np CORONA
5303 Å



1.15 $R_\odot$ 1538 UT
1.35 $R_\odot$ 1515 UT
1.55 $R_\odot$ 1526 UT

Sp

KITT PEAK Np MAGNETOGRAM
Bright - Plus
Dark - Minus

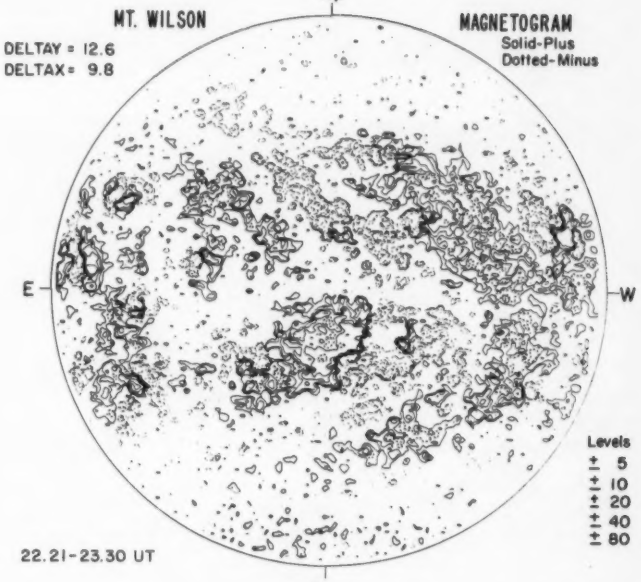


1655 UT

Sp

MT. WILSON Np MAGNETOGRAM
Solid-Plus
Dotted-Minus

DELTAY = 12.6
DELTAX = 9.8



22.21-23.30 UT

Sp

01

SACRAMENTO PEAK

Np

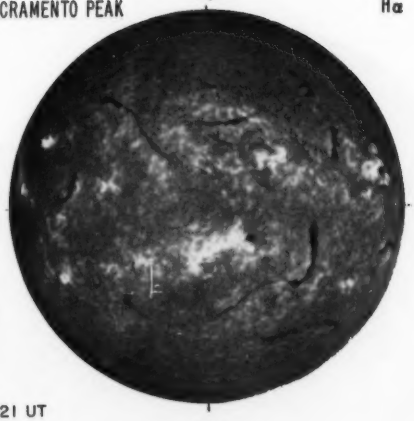
Hα

E

W

Sp

1521 UT



BIG BEAR

Np

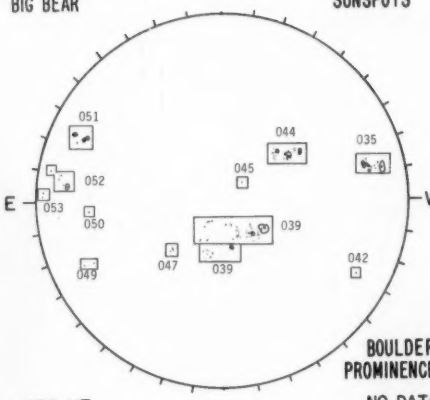
SUNSPOTS

E

W

Sp

1720 UT



BOULDER PROMINENCES

NO DATA

BIG BEAR

Np

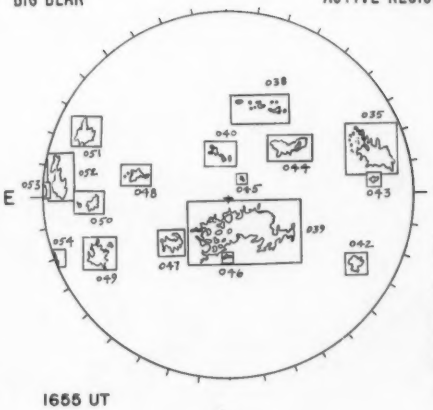
ACTIVE REGIONS

E

W

Sp

1655 UT



GOOD	MM
35-	4500-3.5
39-	9000-3.5
42-	0600-2.5
44-	1600-3.5
47-	0700-3.0
48-	0500-3.0
49-	1600-3.0
50-	0600-2.5
51-	2000-3.0
52-	3500-3.0

STANFORD

Np

MAGNETOGRAM

Solid - Plus; zero level

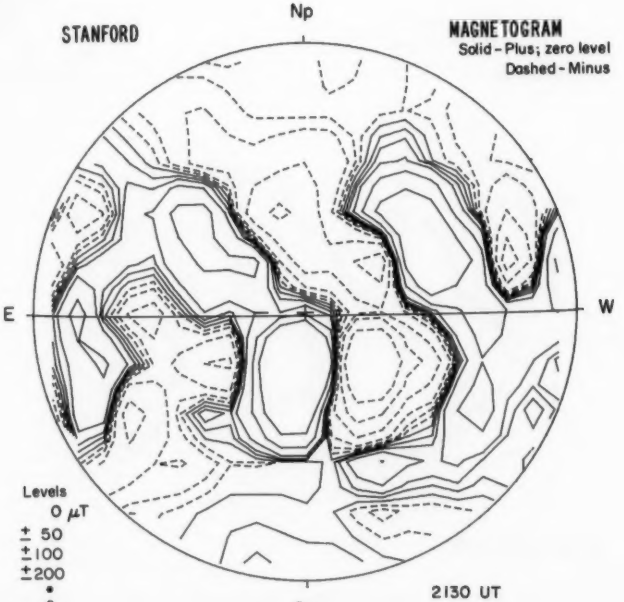
Dashed - Minus

E

W

Sp

2130 UT



Levels

0 μT

± 50

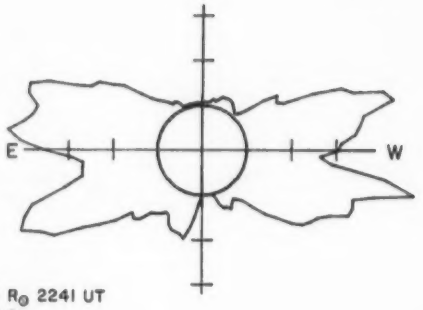
±100

±200

• • •

DECEMBER 2, 1981 (P= 15.76, B_o = 0.73, L_o = 52.13)

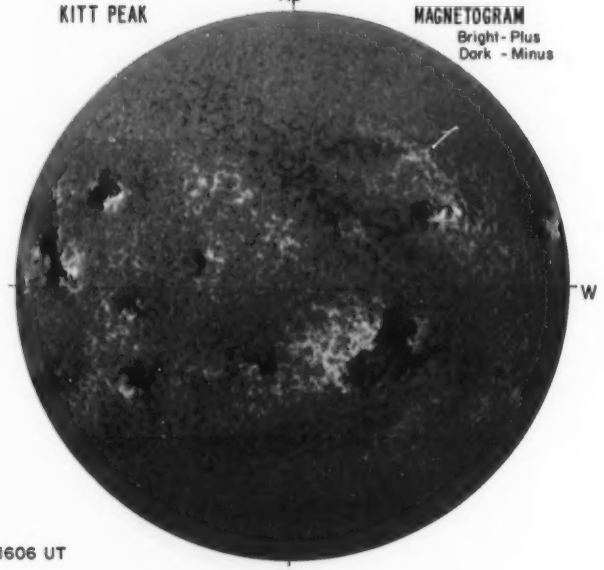
SACRAMENTO PEAK Np CORONA 5303 Å



1.15 $R_\odot$ 2241 UT
1.35 $R_\odot$
1.55 $R_\odot$

Sp

KITT PEAK Np MAGNETOGRAM
Bright - Plus
Dark - Minus

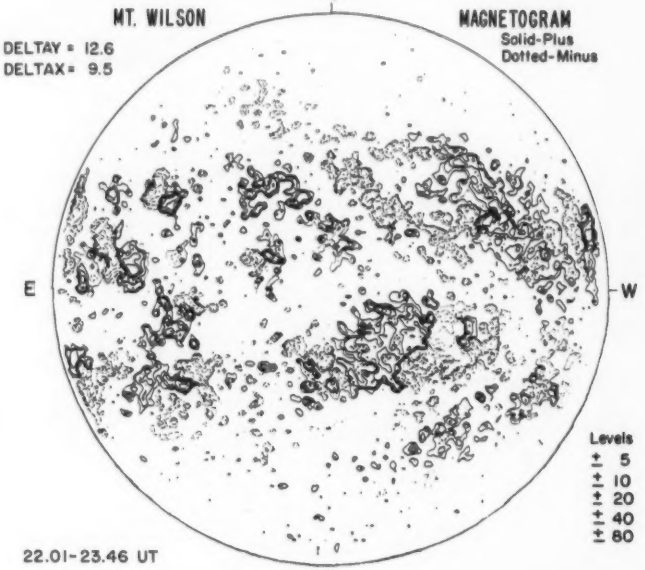


1606 UT

Sp

MT. WILSON Np MAGNETOGRAM
Solid-Plus
Dotted-Minus

DELTAY = 12.6
DELTAX = 9.5

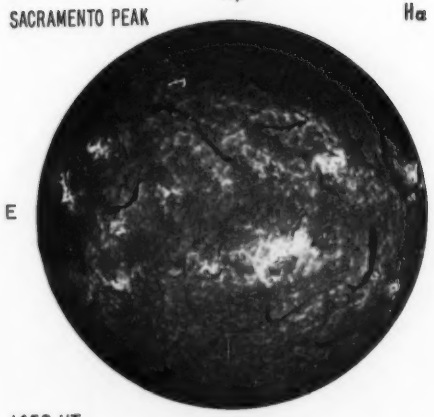


22.01-23.46 UT

Sp

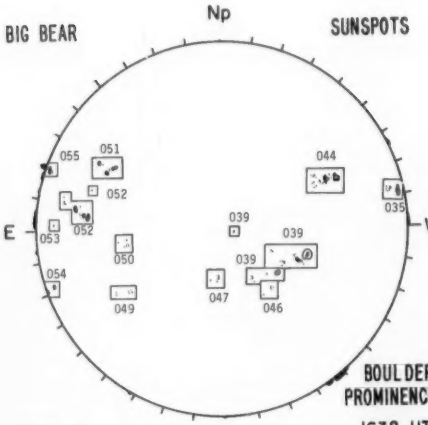
02

SACRAMENTO PEAK Hα



1452 UT

BIG BEAR SUNSPOTS

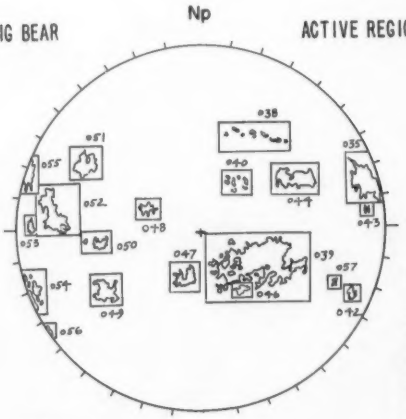


2010 UT

BOULDER PROMINENCES

1638 UT

BIG BEAR ACTIVE REGIONS



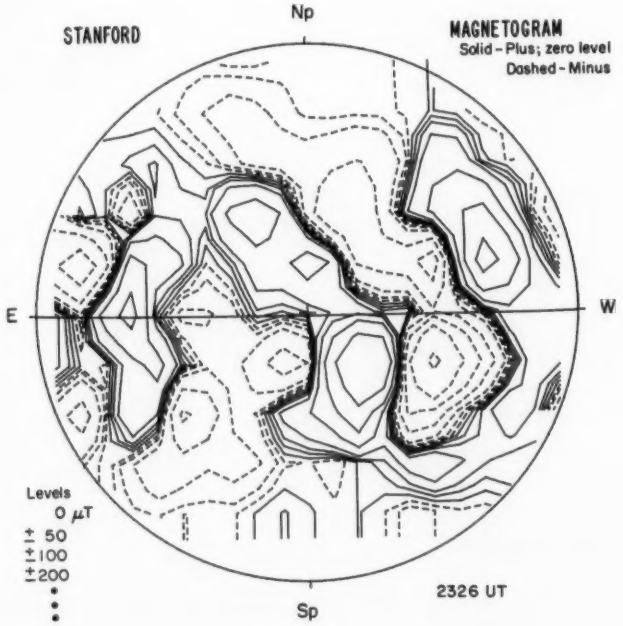
1606 UT

GOOD	WM
35-	4500-3.0
39-	9000-3.5
44-	2700-3.5
46-	0200-2.5
47-	0700-3.0
48-	0500-3.0
49-	1500-3.0
50-	0500-3.0
51-	2000-3.5
52-	3500-3.0
55-	3300-3.5
56-	0500-2.5
57-	0200-2.5

STANFORD MAGNETOGRAM

Solid - Plus; zero level

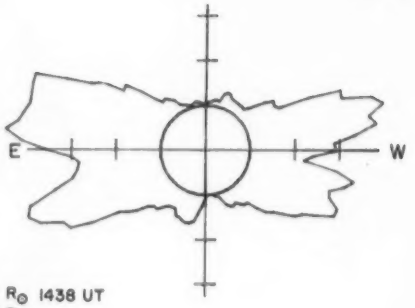
Dashed - Minus



2326 UT

DECEMBER 3, 1981 (P= 15.37, B_o = 0.60, L_o = 38.95)

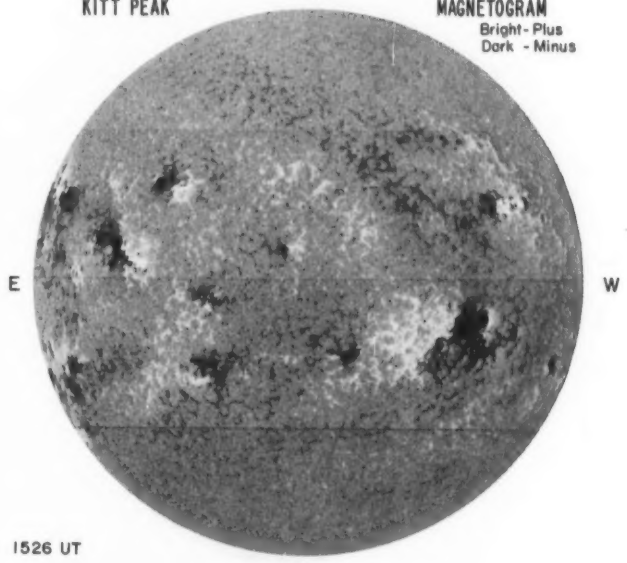
SACRAMENTO PEAK Np CORONA 5303 Å



1.15 $R_\odot$ 1438 UT
1.35 $R_\odot$
1.55 $R_\odot$

Sp

KITT PEAK Np MAGNETOGRAM
Bright - Plus
Dark - Minus

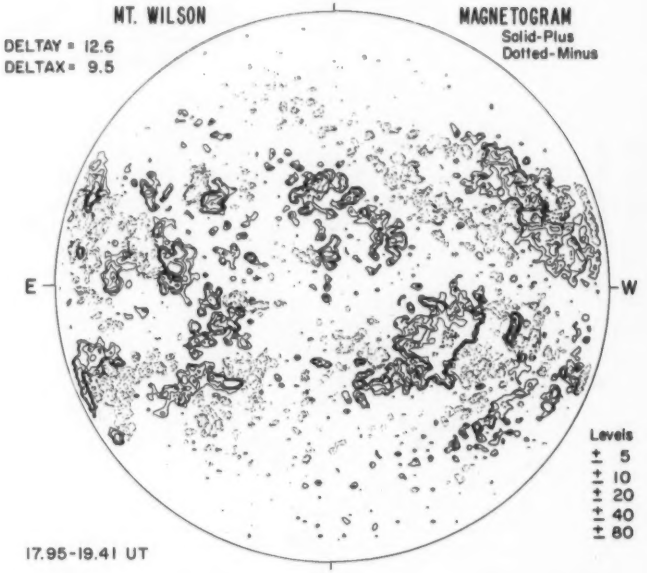


1526 UT

Sp

MT. WILSON Np MAGNETOGRAM
Solid-Plus
Dotted-Minus

DELTAY = 12.6
DELTAX = 9.5

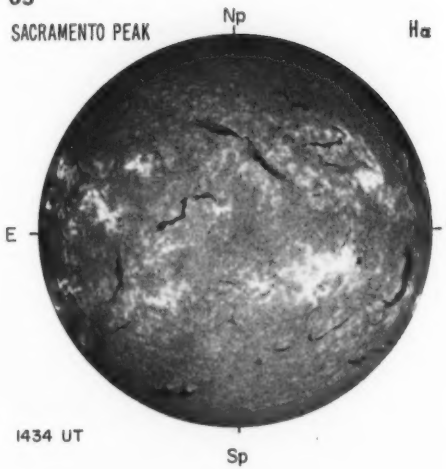


17.95-19.41 UT

Sp

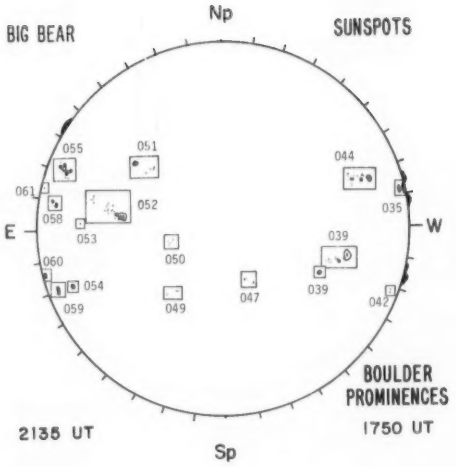
03

SACRAMENTO PEAK Hα



1434 UT

BIG BEAR SUNSPOTS

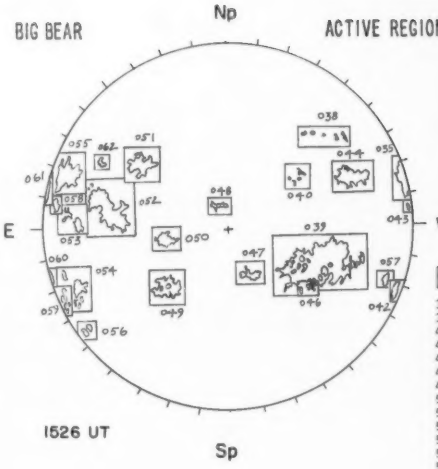


2135 UT

BOULDER PROMINENCES

1750 UT

BIG BEAR ACTIVE REGIONS



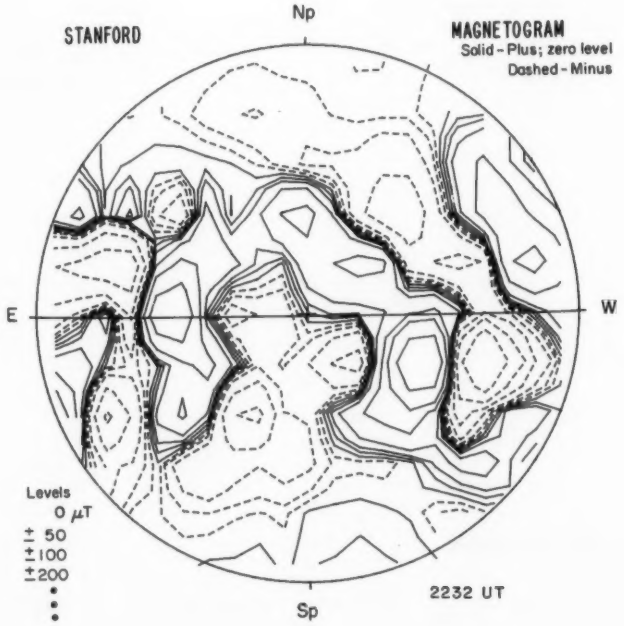
1526 UT

FAIR	WM

35- 3800-3.5
39- 9300-3.5
42- 0800-2.5
44- 2400-3.5
46- 0200-2.5
47- 0500-3.0
49- 1500-3.0
51- 1800-3.0
52- 4000-3.0
55- 3800-3.0
57- 0400-2.5
58- 0600-3.0
59- 0800-2.5
61- 0800-2.5

STANFORD MAGNETOGRAM

Solid - Plus; zero level
Dashed - Minus



2232 UT

DECEMBER 4, 1981 (P= 14.97, B_o= 0.47, L_o= 25.77)

SACRAMENTO PEAK Np CORONA
5303 Å

E NO DATA DECEMBER 4, 5, 11, 12, 13, 19, 25, 26, 27, 29, 31 W

1.15 $R_\odot$
1.35 $R_\odot$
1.55 $R_\odot$

Sp

Np

KITT PEAK Np MAGNETOGRAM
Bright - Plus
Dark - Minus

MT. WILSON Np MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =

E NO DATA DECEMBER 4, 5, 11, 12, 24, 25 W

E NO DATA DECEMBER 4, 9, 10, 11, 13, 17, 18, 19, 20, 22, 25, 26, 27, 30 W

Levels
± 5
± ± 10
± ± ± 20
± ± ± ± 40
± ± ± ± ± 80

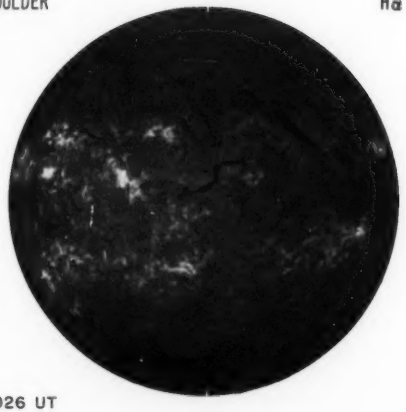
Sp

Sp

04

BOULDER

Np



E W

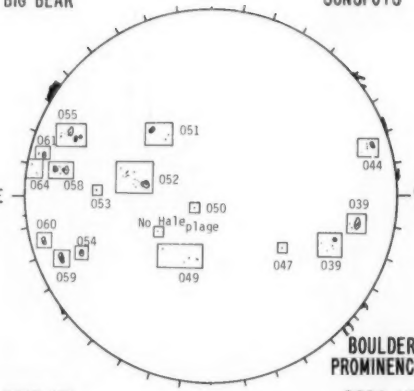
2026 UT

Sp

Hα

BIG BEAR

Np



E W

1800 UT

Sp

SUNSPOTS

BIG BEAR

Np

BOULDER PROMINENCES

E W

2026 UT

Sp

ACTIVE REGIONS

Np

NO DATA DECEMBER 4, 5, 11, 12, 24, 25

E W

Sp

STANFORD

Np

MAGNETOGRAM

Solid - Plus; zero level

Dashed - Minus

E NO DATA DECEMBER 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20, 23, 25, 26, 29, 30, 31 W

Levels

0 μT

± 50

± 100

± 200

Sp

DECEMBER 5, 1981 (P= 14.56, B_o= 0.35, L_o= 12.59)

SACRAMENTO PEAK Np CORONA 5303 Å

E NO DATA W

KITT PEAK Np MAGNETOGRAM Bright - Plus Dark - Minus

E NO DATA W

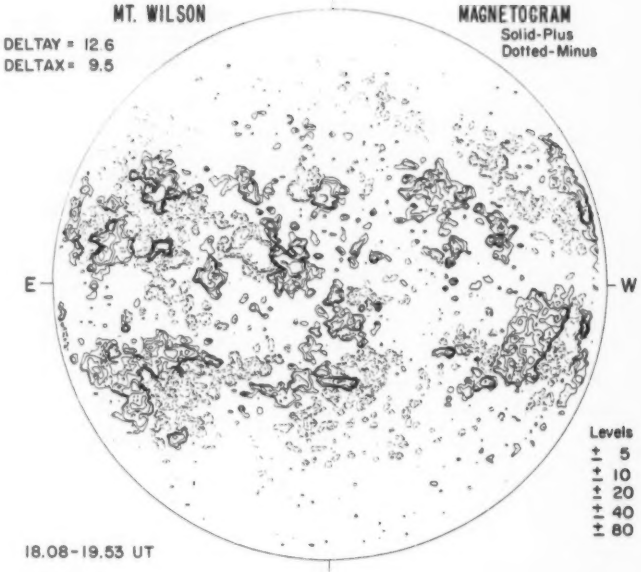
Sp

1.15 $R_\odot$
1.35 $R_\odot$
1.55 $R_\odot$

Sp Np

MT. WILSON MAGNETOGRAM Solid-Plus Dotted-Minus

DELTAY = 12.6
DELTAX = 9.5



18.08-19.53 UT

Sp

05

BOULDER

Np

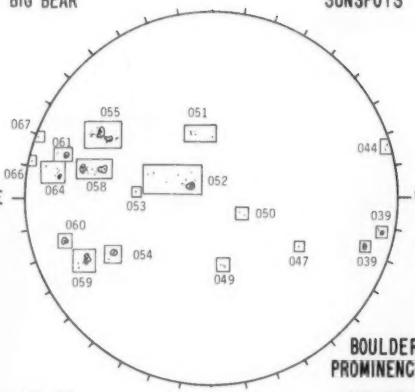
E NO DATA W

Sp

Hα

BIG BEAR

Np



E W E W E

1945 UT

Sp

SUNSPOTS

BIG BEAR

Np

BOULDER PROMINENCES

NO DATA

Sp

ACTIVE REGIONS

Np

NO DATA

W

Sp

STANFORD

Np

E NO DATA W

Sp

MAGNETOGRAM

Solid - Plus; zero level

Dashed - Minus

Levels

0 μT

± 50

± 100

± 200

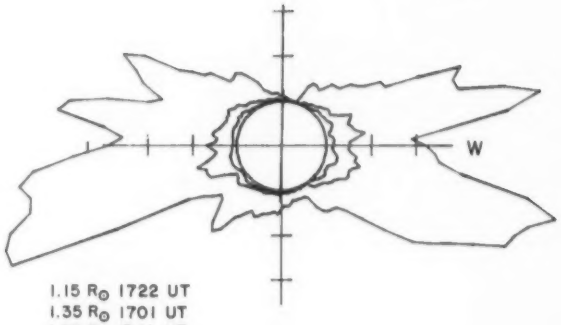
• • •

51

Dec 81

DECEMBER 6, 1981 (P= 14.15, B_o= 0.22, L_o= 359.42)

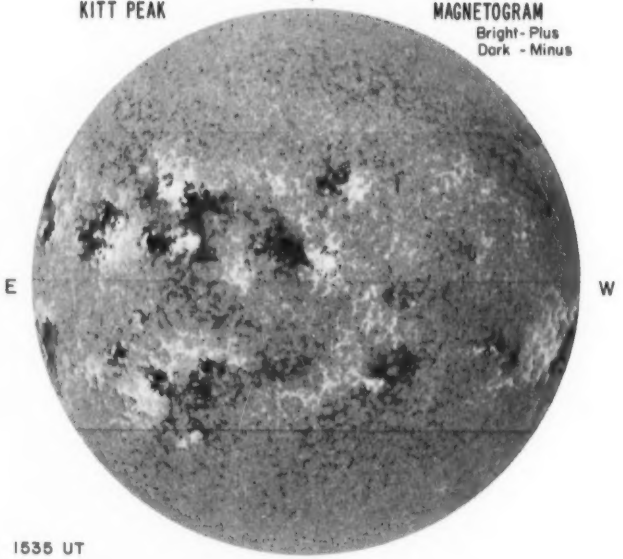
SACRAMENTO PEAK Np CORONA 5303 Å



1.15 $R_\odot$ 1722 UT
1.35 $R_\odot$ 1701 UT
1.55 $R_\odot$ 1711 UT

Sp

KITT PEAK Np MAGNETOGRAM Bright-Plus Dark-Minus

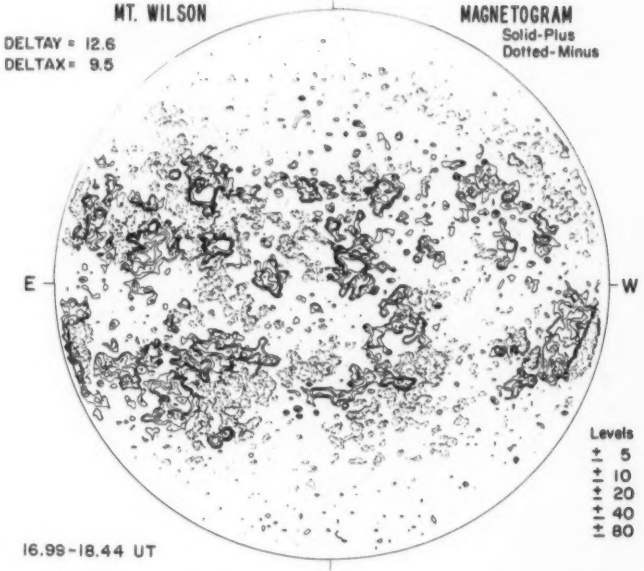


1535 UT

Sp

MT. WILSON Np MAGNETOGRAM Solid-Plus Dotted-Minus

DELTAY = 12.6
DELTAX = 9.5



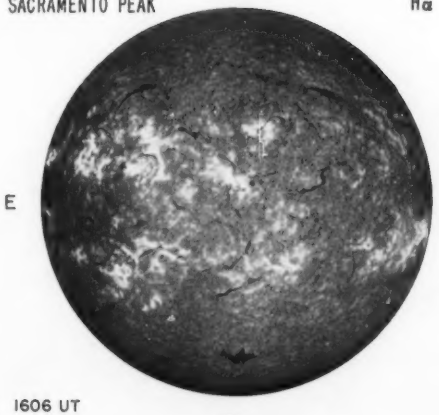
16.99-18.44 UT

Sp

06

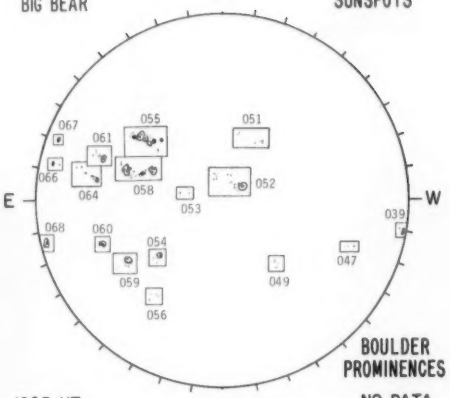
06

SACRAMENTO PEAK Hα



1606 UT

BIG BEAR SUNSPOTS

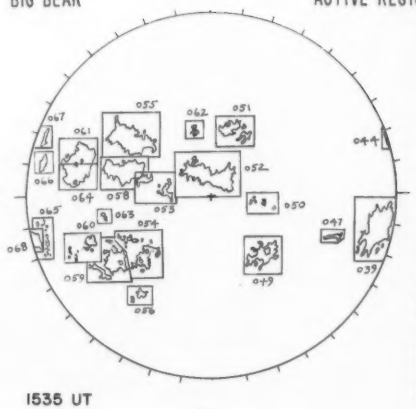


1925 UT

BOULDER PROMINENCES

NO DATA

BIG BEAR ACTIVE REGIONS



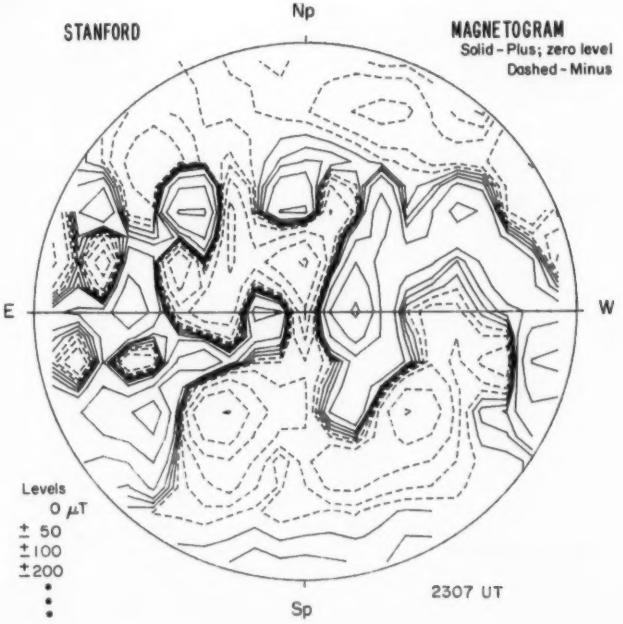
1535 UT

FAIR	WM

39- 9000-3.0
44- 0400-3.5
47- 0200-2.5
49- 1300-3.0
51- 1300-3.0
52- 3500-3.5
55- 3800-3.5
56- 0400-2.5
58- 3500-3.5
59- 2500-3.0
61- 2600-2.5
64- 2800-3.0
66- 1200-2.5
68- 1400-2.5

STANFORD MAGNETOGRAM

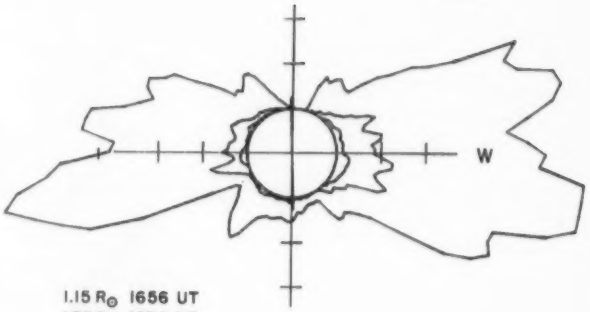
Solid - Plus; zero level
Dashed - Minus



2307 UT

DECEMBER 7, 1981 (P= 13.74, B_o= 0.09, L_o= 346.24)

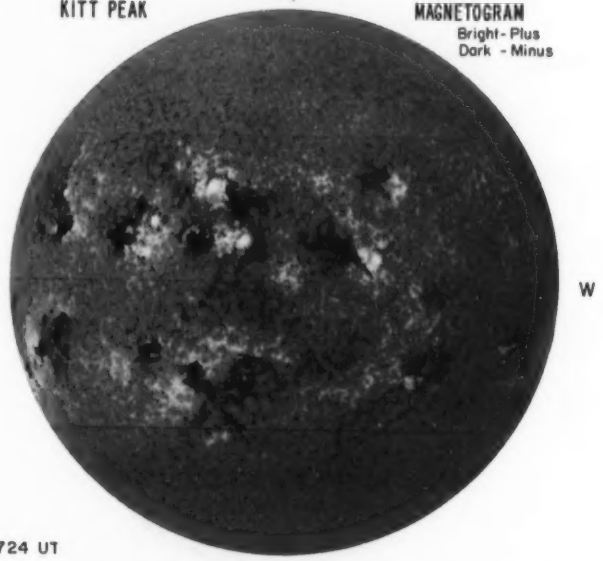
SACRAMENTO PEAK Np CORONA 5303 Å



1.15 $R_\odot$ 1656 UT
1.35 $R_\odot$ 1634 UT
1.55 $R_\odot$ 1644 UT

Sp

KITT PEAK Np MAGNETOGRAM Bright-Plus Dark - Minus

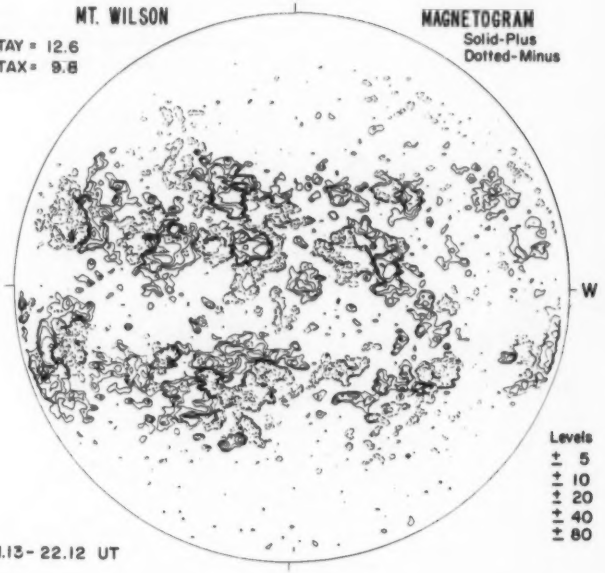


1724 UT

Sp

MT. WILSON Np MAGNETOGRAM Solid-Plus Dotted-Minus

DELTAY = 12.6
DELTAX = 9.8



21.13-22.12 UT

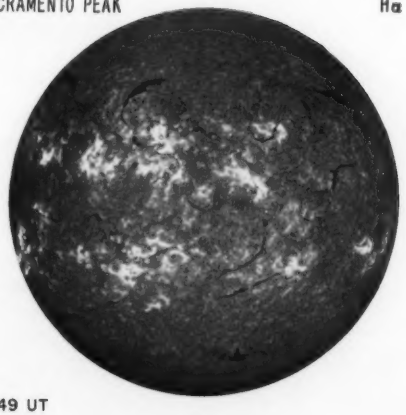
Sp

07

SACRAMENTO PEAK

Np

Hα



E W

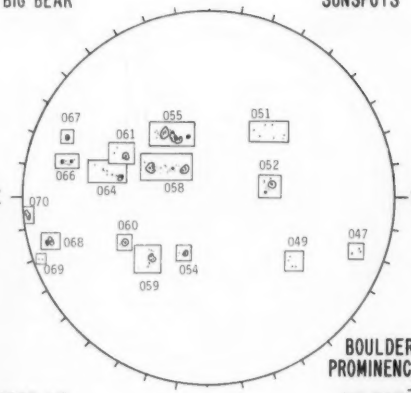
1549 UT

Sp

BIG BEAR

Np

SUNSPOTS



E W

1820 UT

Sp

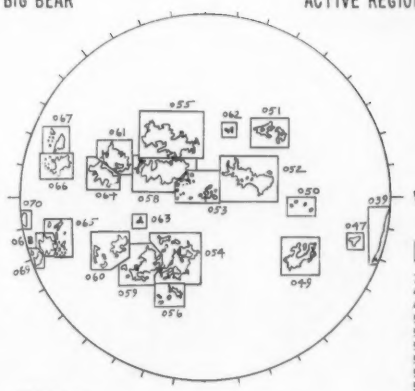
BOULDER PROMINENCES

NO DATA

BIG BEAR

Np

ACTIVE REGIONS



E W

1724 UT

Sp

---- WM

39- 5500-3.0
47- 0400-3.5
49- 1800-3.0
51- 1100-2.5
52- 2900-3.0
53- 0600-2.5
55- 3700-3.5
58- 3700-3.5
59- 2300-3.0
61- 2200-2.5
64- 2100-3.0
66- 1500-3.0
68- 1200-2.5
69- 2000-2.5
70- 0700-3.5

STANFORD

Np

MAGNETOGRAM

Solid - Plus; zero level

Dashed - Minus

E

NO DATA

W

Levels

0 μT

± 50

±100

±200

•

•

•

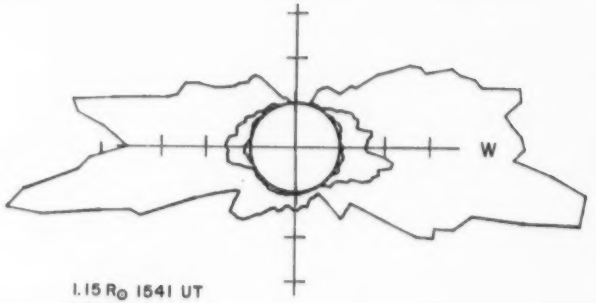
Sp

DECEMBER 8, 1981 (P= 13.32, B_o=-0.04, L_o= 333.06)

SACRAMENTO PEAK

Np

CORONA
5303 Å



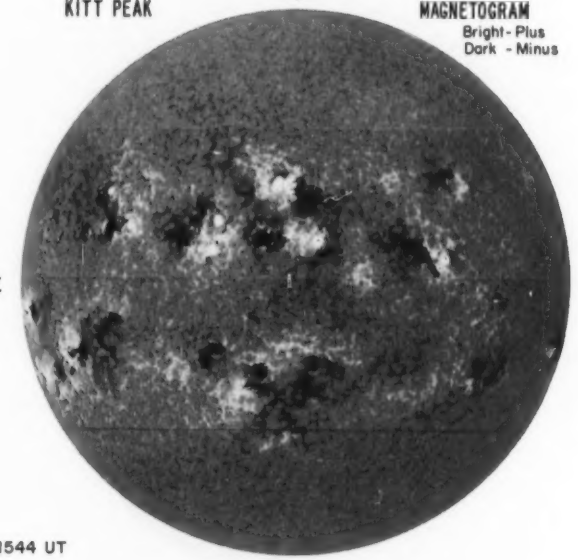
1.15 $R_\odot$ 1541 UT
1.35 $R_\odot$ 1521 UT
1.55 $R_\odot$ 1531 UT

Sp

KITT PEAK

Np

MAGNETOGRAM
Bright - Plus
Dark - Minus



1544 UT

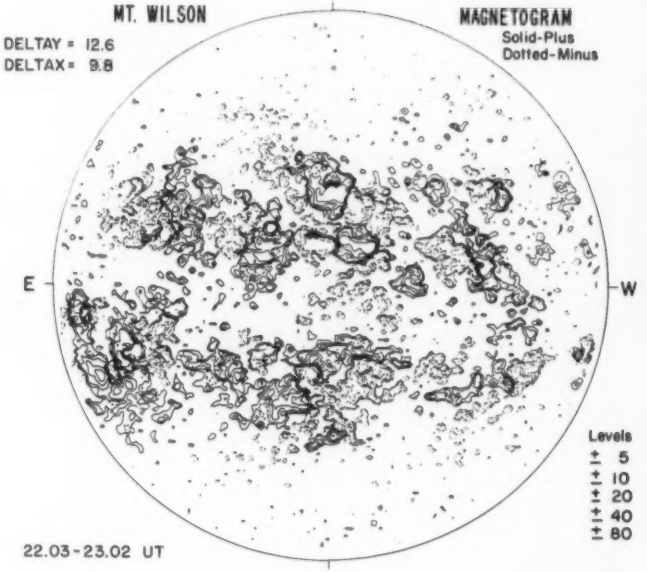
Sp

MT. WILSON

Np

MAGNETOGRAM
Solid-Plus
Dotted-Minus

DELTAY = 12.6
DELTAX = 9.8

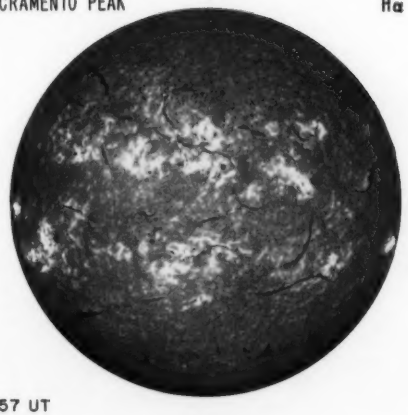


22.03-23.02 UT

Sp

08

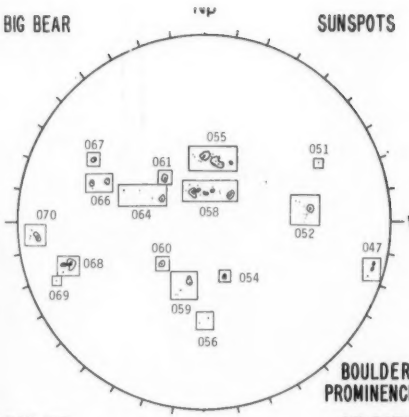
SACRAMENTO PEAK Np Hα



E W

1557 UT Sp

BIG BEAR Np SUNSPOTS



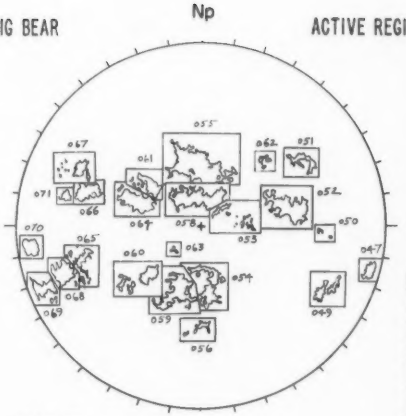
E W

2000 UT Sp

BOULDER PROMINENCES

NO DATA

BIG BEAR Np ACTIVE REGIONS



E W

1544 UT Sp

GOOD	WM

47- 1500-3.5
49- 1500-2.5
51- 0900-2.5
52- 3300-2.5
53- 0600-2.5
55- 4400-4.0
56- 0400-2.5
58- 3300-3.0
59- 2700-2.5
64- 2200-3.5
66- 1700-3.5
68- 2000-3.0
69- 2700-2.5
70- 2300-3.5
71- 0500-2.5

STANFORD Np

MAGNETOGRAM

Solid - Plus; zero level

Dashed - Minus

E NO DATA W

Levels

0 μT

± 50

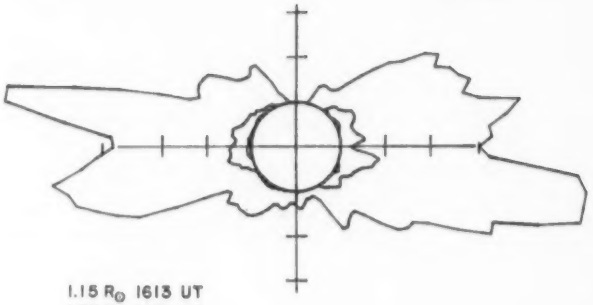
±100

±200

Sp

DECEMBER 9, 1981 (P= 12.89, B_o=-0.17, L_o= 319.88)

SACRAMENTO PEAK Np CORONA 5303 Å

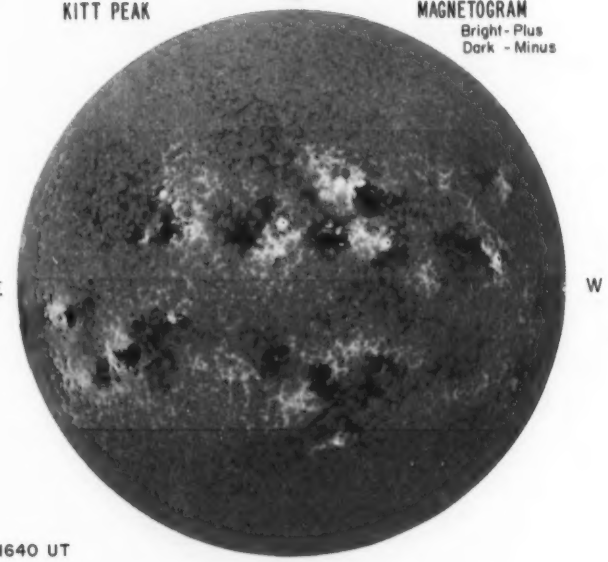


1.15 $R_\odot$ 1613 UT
1.35 $R_\odot$ 1553 UT
1.55 $R_\odot$ 1602 UT

Sp

Np

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



E W

1640 UT

Sp

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =

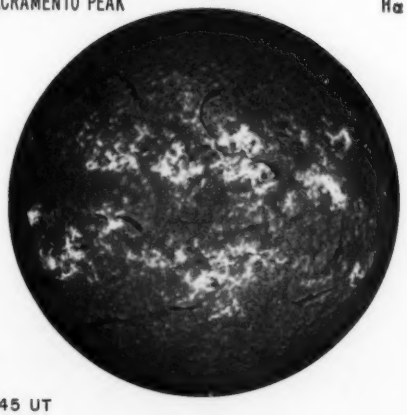
E NO DATA W

Levels
± 5
± ± 10
± ± ± 20
± ± ± ± 40
± ± ± ± ± 80

Sp

09

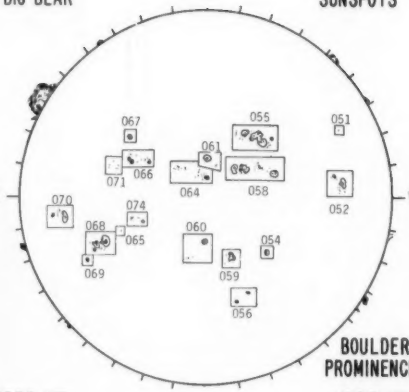
SACRAMENTO PEAK Np Hα



E W

1445 UT Sp

BIG BEAR Np SUNSPOTS



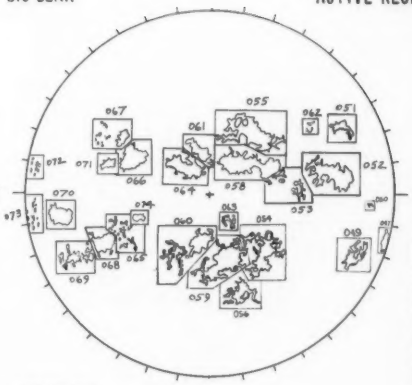
E W

2050 UT Sp

BOULDER PROMINENCES

1928 UT

BIG BEAR Np ACTIVE REGIONS



E W

1640 UT Sp

GOOD	WM

47- 1500-3.5
49- 1700-2.5
52- 3800-3.0
53- 0600-2.5
54- 2300-2.5
55- 4300-4.0
56- 0600-2.5
58- 3800-3.5
59- 3300-2.5
64- 2000-2.5
66- 2000-3.5
68- 1800-3.5
69- 2000-2.5
70- 2000-3.5
74- 0300-3.5

STANFORD Np

MAGNETOGRAM
Solid - Plus; zero level
Dashed - Minus

E NO DATA W

Levels
0 μT
± 50
±100
±200
•
•
•

Sp

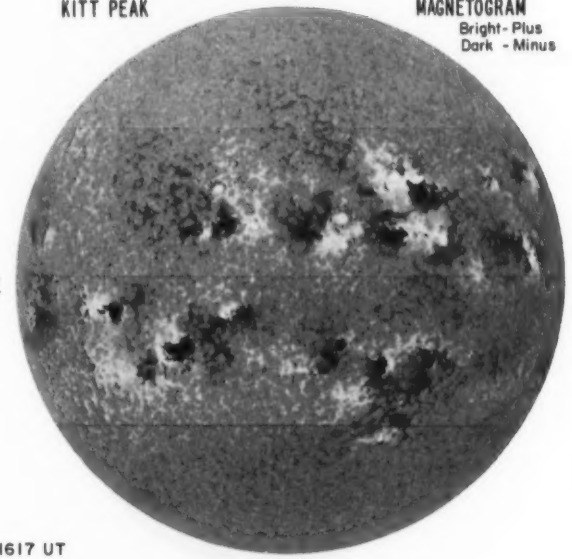
59
Dec 81

DECEMBER 10, 1981 (P= 12.46, B_o=-0.29, L_o= 306.71)

KITT PEAK

Np

MAGNETOGRAM
Bright - Plus
Dark - Minus



E

W

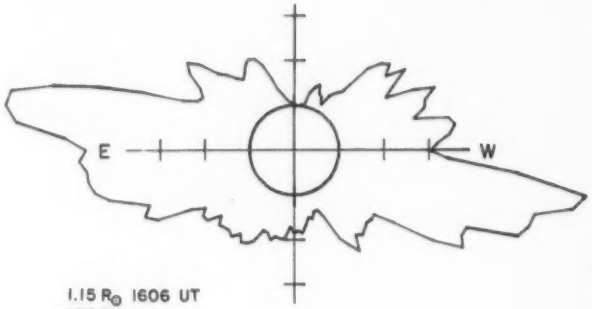
1617 UT

Sp

SACRAMENTO PEAK

Np

CORONA
5303 Å



1.15 $R_\odot$ 1606 UT
1.35 $R_\odot$
1.55 $R_\odot$

Sp

Np

MT. WILSON

MAGNETOGRAM
Solid-Plus
Dotted-Minus

DELTAY =
DELTAX =

E

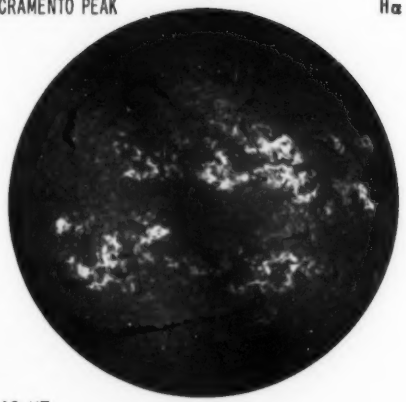
NO DATA

W

Levels
± 5
±+ 10
±+±+ 20
±+±+±+ 40
±+±+±+±+ 80

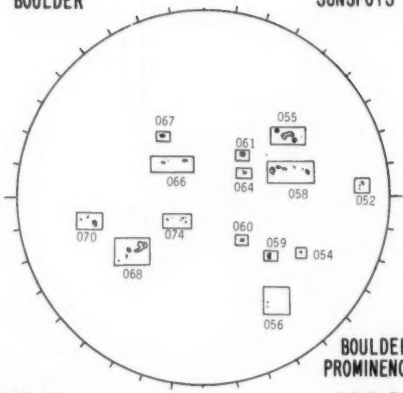
Sp

SACRAMENTO PEAK — Hα



1440 UT

BOULDER — SUNSPOTS

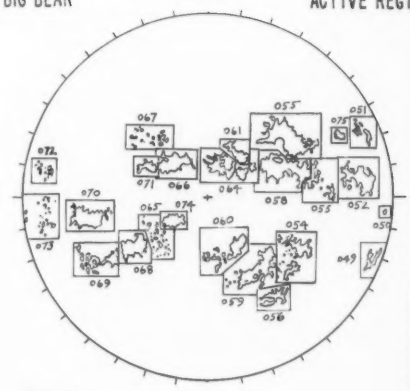


2100 UT

BOULDER PROMINENCES

NO DATA

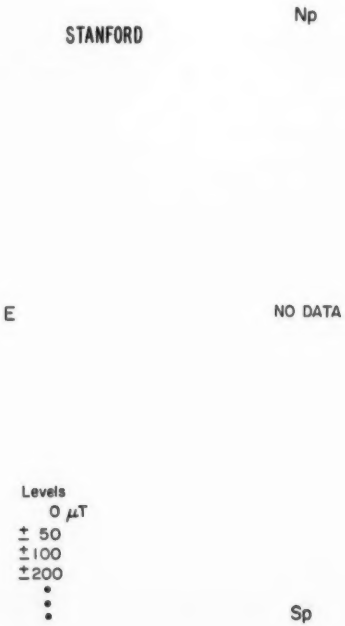
BIG BEAR — ACTIVE REGIONS



1617 UT

GOOD	MM
52-	3500-3.0
53-	0700-2.5
54-	2500-2.5
55-	4400-4.0
58-	3700-3.5
59-	2800-2.5
64-	2000-2.5
66-	1600-3.0
68-	1800-3.5
69-	2000-2.5
70-	2200-3.0
74-	0900-3.5
75-	0300-2.5

STANFORD



MAGNETOGRAM
Solid - Plus; zero level
Dashed - Minus

Levels
0 μT
± 50
±100
±200
•
•
•

DECEMBER 11, 1981 (P= 12.03, B_o=-0.42, L_o= 293.53)

SACRAMENTO PEAK

Np

CORONA
5303 Å

E

NO DATA

W

1.15 $R_\odot$
1.35 $R_\odot$
1.55 $R_\odot$

Sp

Np

KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus

MT. WILSON

DELTAY =
DELTAX =

MAGNETOGRAM
Solid-Plus
Dotted-Minus

E

NO DATA

W

E

NO DATA

W

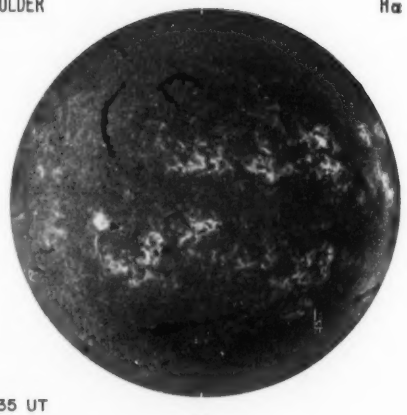
Levels
± 5
± 10
± 20
± 40
± 80

Sp

Sp

11

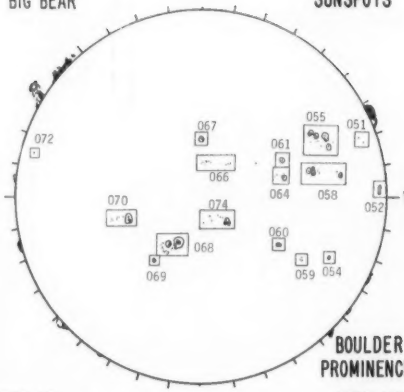
BOULDER Np Hα



E W

1635 UT Sp

BIG BEAR Np SUNSPOTS



2020 UT Sp 1635 UT

BIG BEAR Np ACTIVE REGIONS

NO DATA

E W

Sp

STANFORD Np

MAGNETOGRAM

Solid - Plus; zero level

Dashed - Minus

E NO DATA W

Levels

0 μT

± 50

±100

±200

•

•

•

Sp

DECEMBER 12, 1981 (P= 11.59, B_o=-0.55, L_o= 280.35)

SACRAMENTO PEAK Np CORONA 5303 Å

E NO DATA W

1.15 $R_\odot$
1.35 $R_\odot$
1.55 $R_\odot$

Sp

Np

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus

E NO DATA W

Sp

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY = 12.6
DELTAX = 9.6

E W

Levels
± 5
± 10
± 20
± 40
± 80

21.57-22.54 UT

Sp

12

Np

Np

SACRAMENTO PEAK

Np

E NO DATA W

Sp

Hα

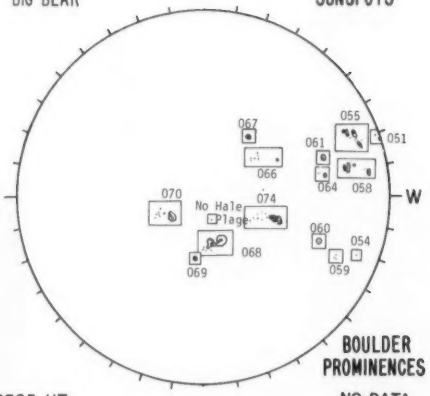
BIG BEAR

Np

E W

2305 UT

Sp



SUNSPOTS

BIG BEAR

Np

W E

BOULDER PROMINENCES

NO DATA

Sp

ACTIVE REGIONS

Np

NO DATA

W

Sp

STANFORD

Np

E NO DATA W

Sp

MAGNETOGRAM

Solid - Plus; zero level

Dashed - Minus

Levels

0 μT

± 50

±100

±200

•

•

•

65

Dec 81

DECEMBER 13, 1981 (P= 11.15, B_o=-0.68, L_o= 267.18)

SACRAMENTO PEAK Np CORONA 5303 Å

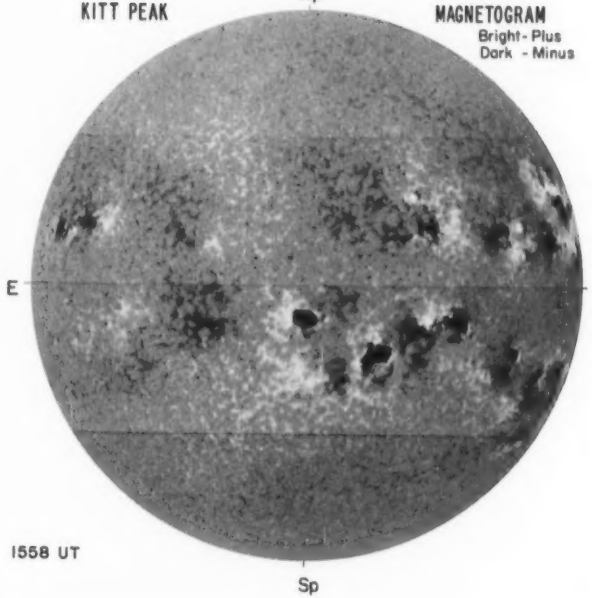
E NO DATA W

1.15 $R_\odot$
1.35 $R_\odot$
1.55 $R_\odot$

Sp

Np

KITT PEAK Np MAGNETOGRAM Bright-Plus Dark-Minus



E W

1558 UT

Sp

MT. WILSON MAGNETOGRAM Solid-Plus Dotted-Minus

DELTAY =
DELTAX =

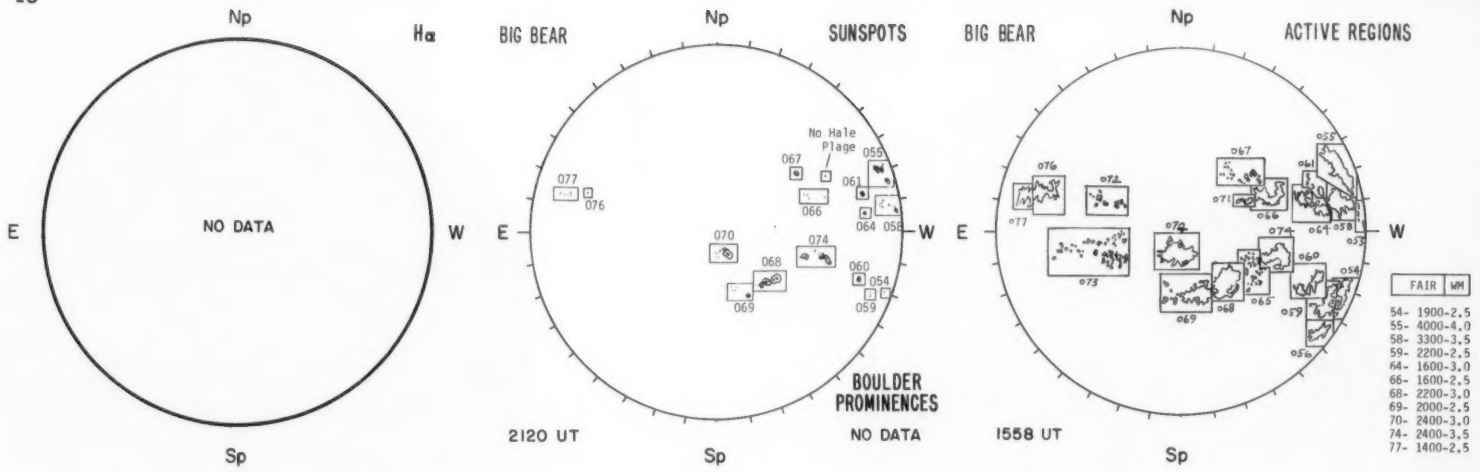
E NO DATA W

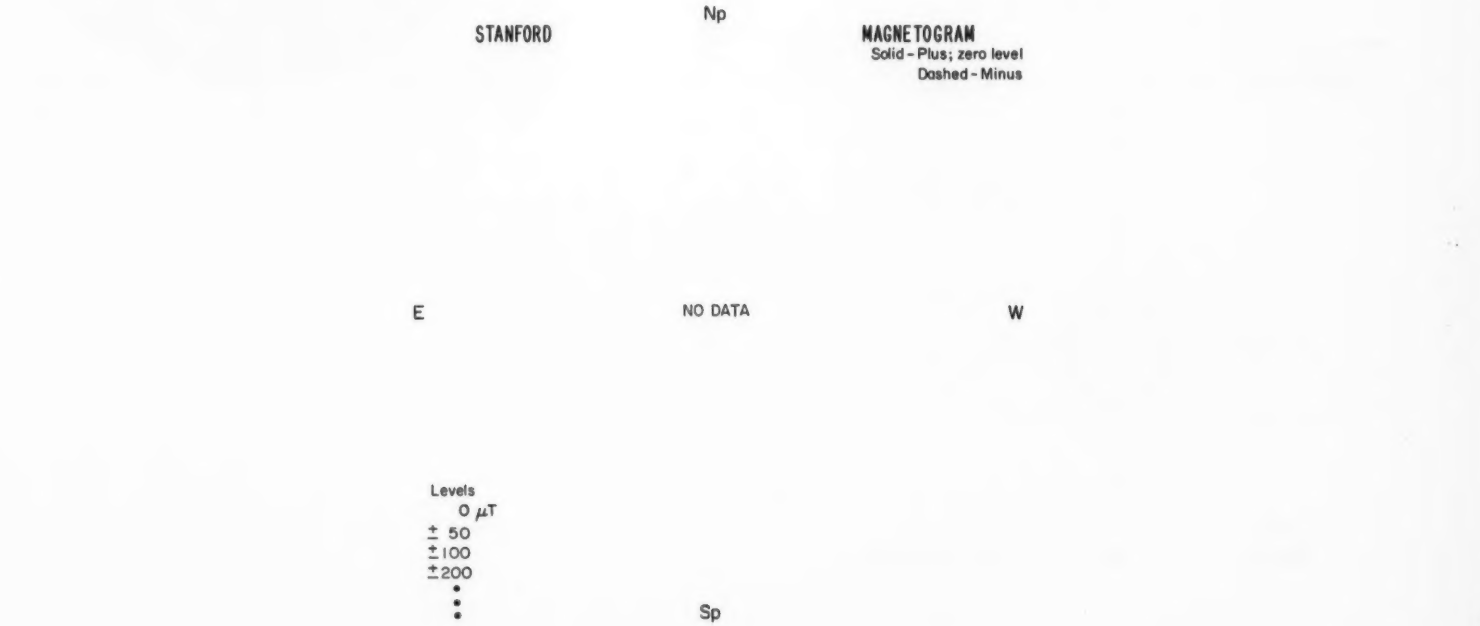
Levels
± 5
± 10
± 20
± 40
± 80

Sp

13

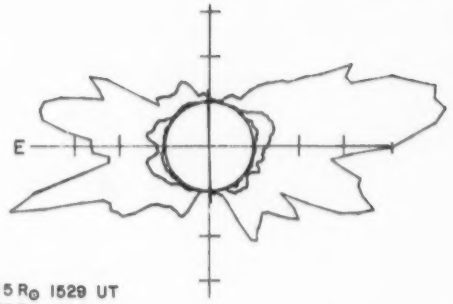
Np Np Np ACTIVE REGIONS


Np
Hα
NO DATA
E
W
Sp
BIG BEAR
SUNSPOTS
No Hale Plage
2120 UT
BOULDER PROMINENCES
NO DATA
BIG BEAR
ACTIVE REGIONS
1558 UT
FAIR | WM
54- 1900-2.5
55- 4000-4.0
58- 3300-3.5
59- 2200-2.5
64- 1600-3.0
66- 1600-2.5
68- 2200-3.0
69- 2000-2.5
70- 2400-3.0
74- 2400-3.5
77- 1400-2.5


STANFORD
Np
MAGNETOGRAM
Solid - Plus; zero level
Dashed - Minus
E
NO DATA
W
Levels
0 μT
± 50
±100
±200
Sp

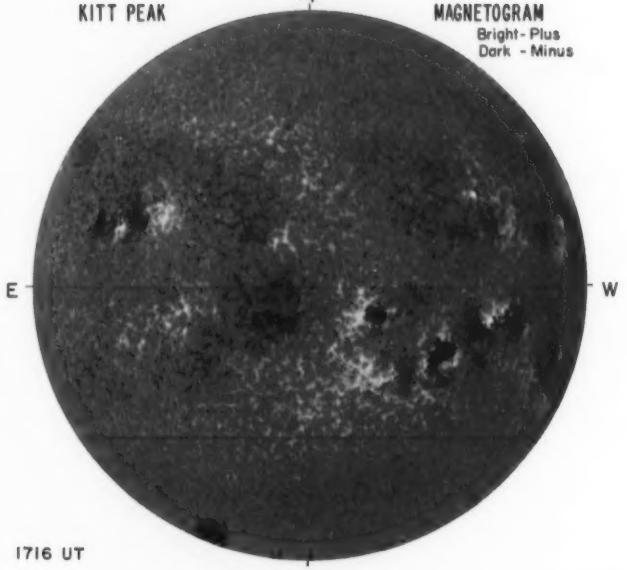
DECEMBER 14, 1981 (P= 10.70, B_o=-0.81, L_o= 254.00)

SACRAMENTO PEAK Np CORONA
5303 Å



1.15 $R_\odot$ 1529 UT
1.35 $R_\odot$ 1508 UT
1.55 $R_\odot$ 1518 UT

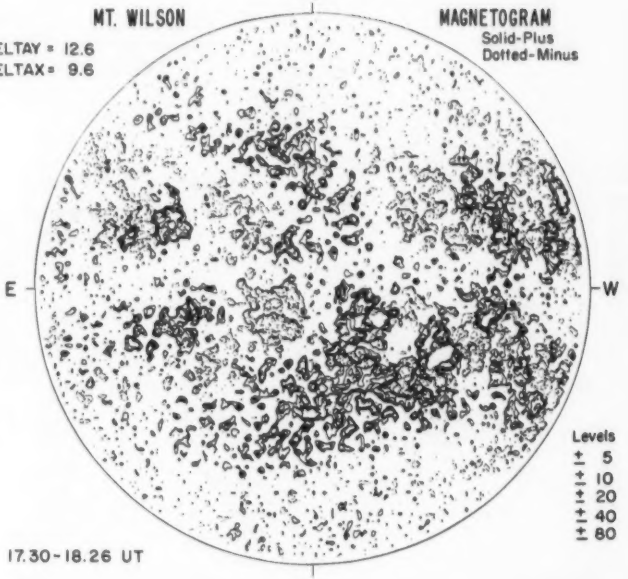
KITT PEAK Np MAGNETOGRAM
Bright - Plus
Dark - Minus



1716 UT

Sp

Sp
Np
MT. WILSON MAGNETOGRAM
Solid-Plus
Dotted-Minus
DELTAY = 12.6
DELTAX = 9.6



17.30-18.26 UT

Sp

SACRAMENTO PEAK Hα

Np

E W

Sp

1439 UT

BIG BEAR SUNSPOTS

Np

077 076 067 066 061 055 058 064 070 074 060 068 069 059

E W

Sp

2030 UT

BOULDER PROMINENCES

NO DATA

BIG BEAR ACTIVE REGIONS

Np

077 076 072 073 070 071 067 066 061 055 058 064 074 060 054 063 069 068 057 056

E W

Sp

1716 UT

	POOR	WM

54- 0900-2.5
55- 2000-4.0
56- 0400-2.5
58- 2800-4.0
59- 2500-3.0
60- 1100-2.5
64- 1300-3.0
66- 1100-2.5
68- 2900-3.0
69- 2000-2.5
70- 2400-3.0
74- 2600-3.5
77- 1400-2.5

STANFORD

Np

E NO DATA W

Sp

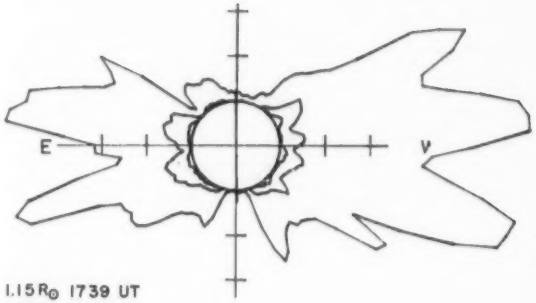
MAGNETOGRAM

Solid - Plus; zero level
Dashed - Minus

Levels
0 μT
± 50
±100
±200
•
•
•

DECEMBER 15, 1981 (P= 10.25, B_o=-0.93, L_o= 240.83)

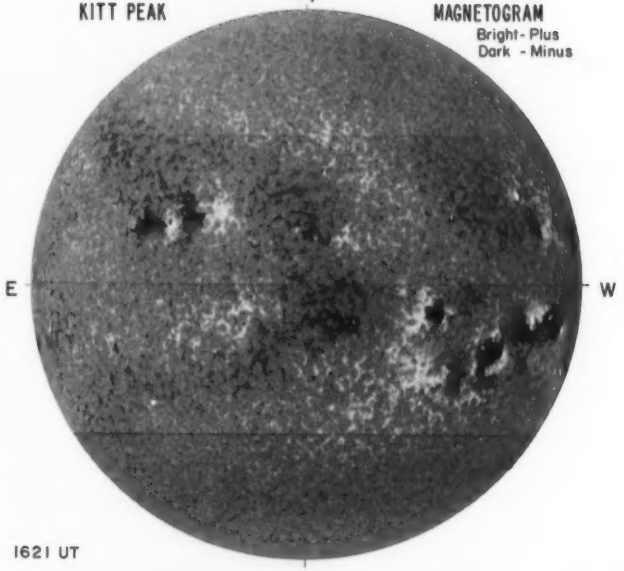
SACRAMENTO PEAK Np CORONA
5303 Å



1.15 $R_\odot$ 1739 UT
1.35 $R_\odot$ 1717 UT
1.55 $R_\odot$ 1727 UT

Sp

KITT PEAK Np MAGNETOGRAM
Bright - Plus
Dark - Minus



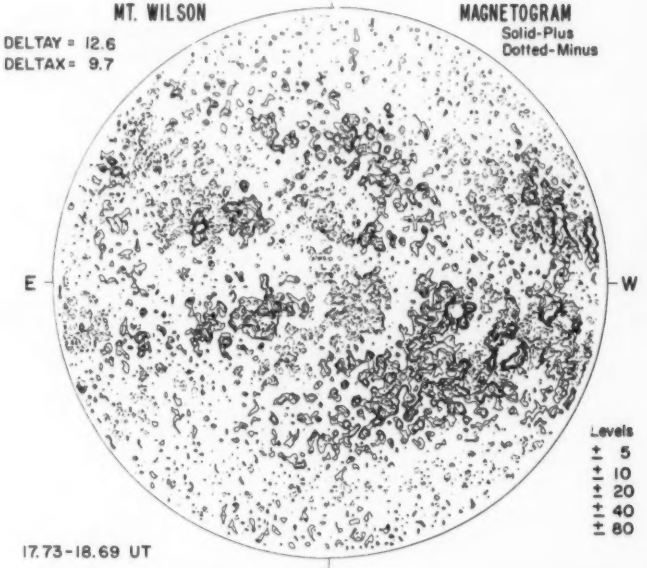
1621 UT

Sp

Np

MT. WILSON MAGNETOGRAM
Solid-Plus
Dotted-Minus

DELTAY = 12.6
DELTAX = 9.7

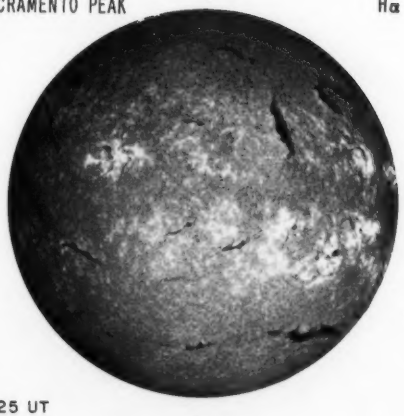


17.73-18.69 UT

Sp

15

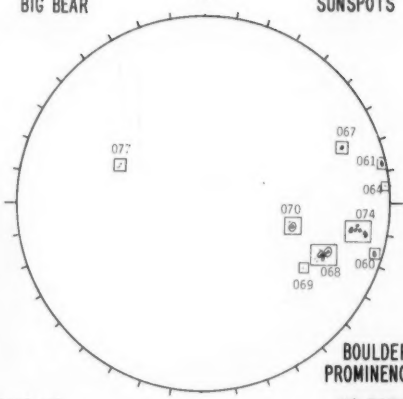
SACRAMENTO PEAK Np Hα



E W

1625 UT Sp

BIG BEAR Np SUNSPOTS

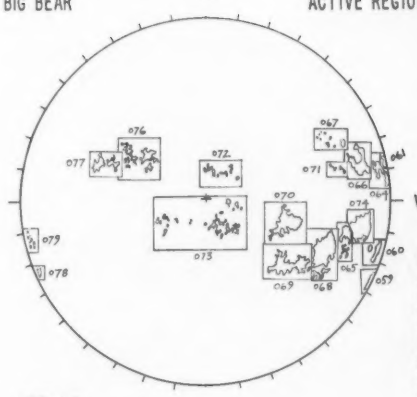


E W

2110 UT Sp

BOULDER PROMINENCES NO DATA

BIG BEAR Np ACTIVE REGIONS



E W

1621 UT Sp

FAIR	WM

59- 0600-3.0
64- 1500-3.0
65- 1200-2.5
66- 1700-2.5
68- 3000-3.5
69- 2000-3.0
70- 2000-3.5
74- 3300-3.5
77- 1000-2.5

STANFORD Np

MAGNETOGRAM
Solid - Plus; zero level
Dashed - Minus

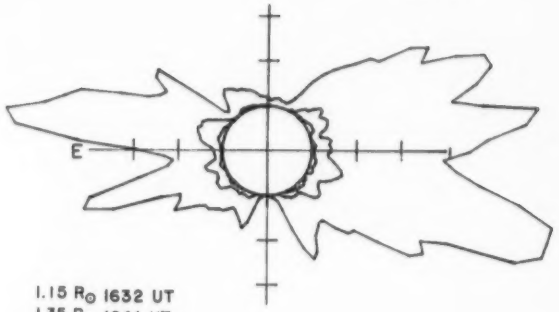
E NO DATA W

Levels
0 μT
± 50
±100
±200
•
•
•

Sp

DECEMBER 16, 1981 (P= 9.79, B_o=-1.06, L_o= 227.65)

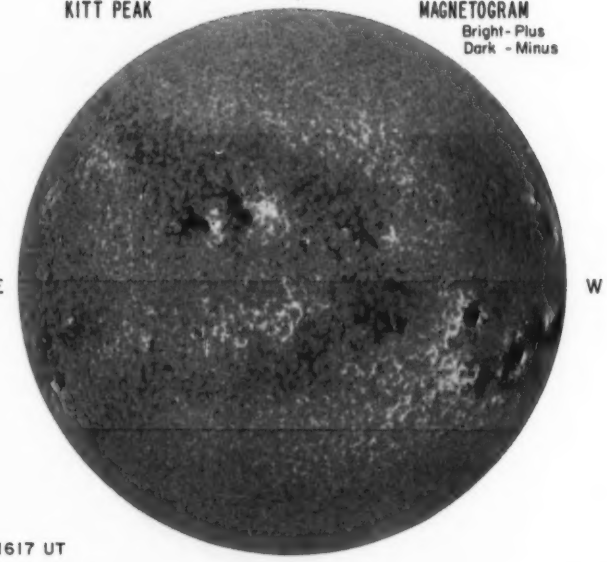
SACRAMENTO PEAK Np CORONA
5303 Å



1.15 $R_\odot$ 1632 UT
1.35 $R_\odot$ 1641 UT
1.55 $R_\odot$ 1652 UT

Sp

KITT PEAK Np MAGNETOGRAM
Bright - Plus
Dark - Minus

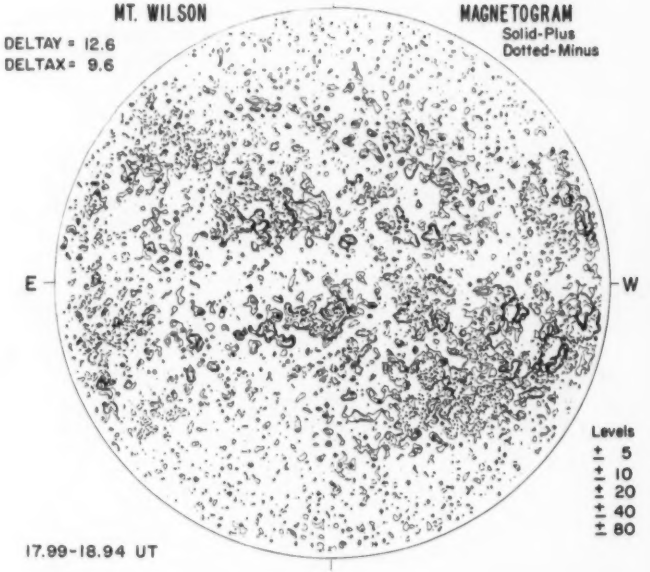


1617 UT

Sp

MT. WILSON Np MAGNETOGRAM
Solid - Plus
Dotted - Minus

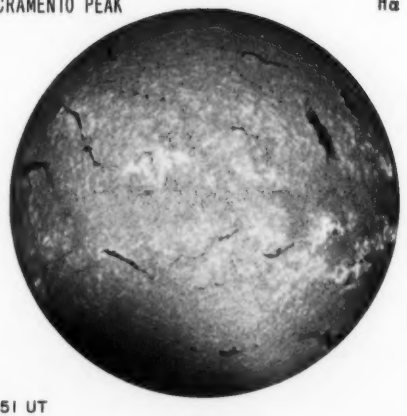
DELTAY = 12.6
DELTAX= 9.6



17.99-18.94 UT

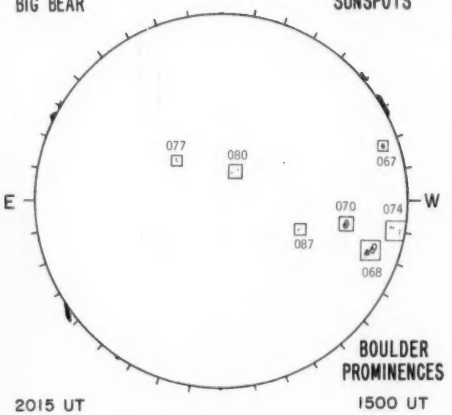
Sp

SACRAMENTO PEAK Hα



1551 UT

BIG BEAR SUNSPOTS

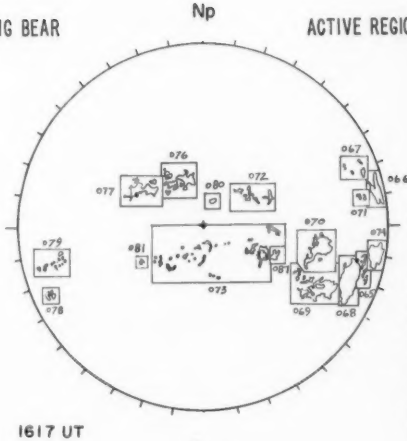


2015 UT

BOULDER PROMINENCES

1500 UT

BIG BEAR ACTIVE REGIONS

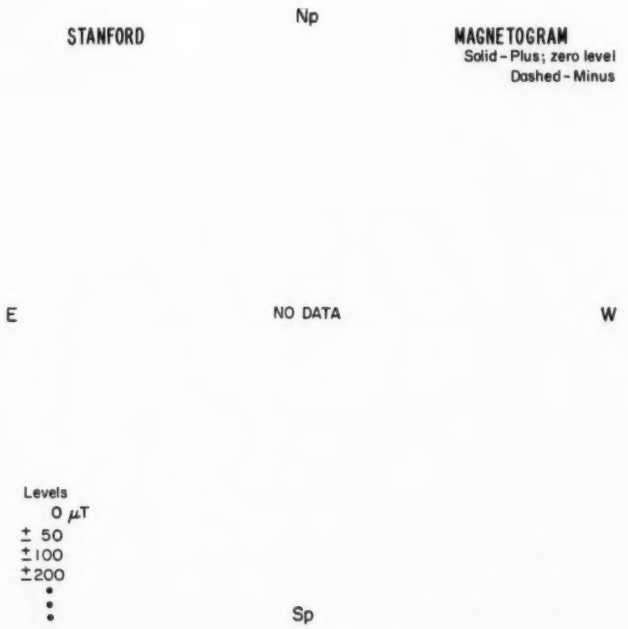


1617 UT

FAIR | WM

65- 0800-2.5
66- 2200-3.0
68- 3000-3.5
69- 2000-3.0
70- 2300-3.0
74- 3400-3.5
76- 1500-2.5
77- 1100-2.5
80- 0100-2.5
87- 0200-2.5

STANFORD



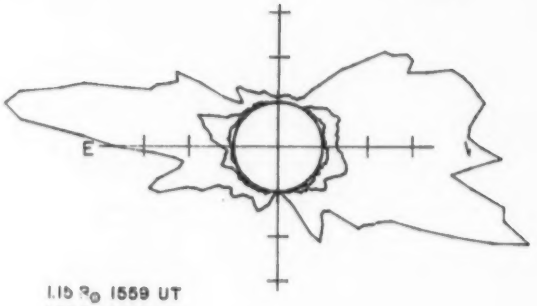
MAGNETOGRAM
Solid - Plus; zero level
Dashed - Minus

NO DATA

Levels
0 μT
± 50
±100
±200

DECEMBER 17, 1981 (P= 9.33, B_o=-1.19, L_o= 214.48)

SACRAMENTO PEAK Np CORONA 5303 Å

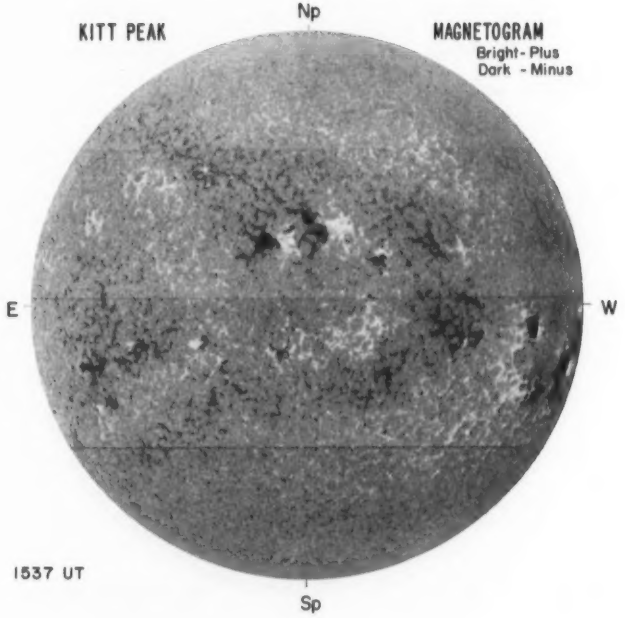


1.15 $R_\odot$ 1559 UT
1.35 $R_\odot$ 1539 UT
1.55 $R_\odot$ 1548 UT

Sp

Np

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1537 UT

MT. WILSON MAGNETOGRAM
Solid-Plus
Dotted-Minus

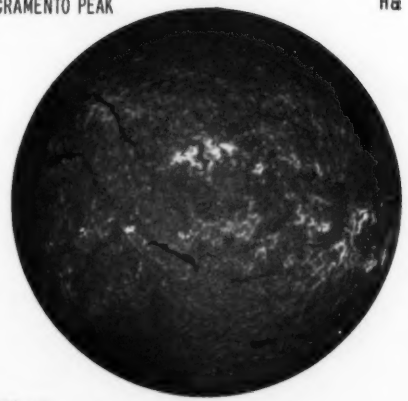
DELTAY =
DELTAX =

E NO DATA W

Levels
± 5
± 10
± 20
± 40
± 80

Sp

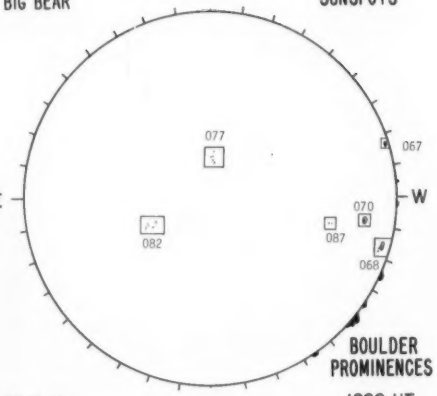
SACRAMENTO PEAK



Hα

1530 UT

BIG BEAR SUNSPOTS

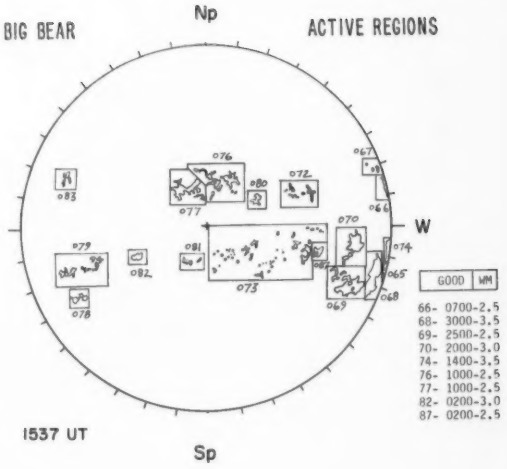


2215 UT

BOULDER PROMINENCES

1800 UT

BIG BEAR ACTIVE REGIONS



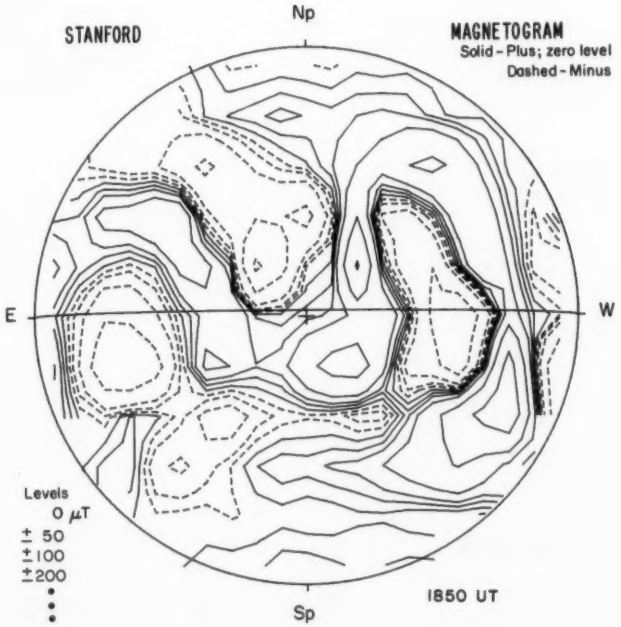
GOOD	WM

66- 0700-2.5
68- 3000-3.5
69- 2500-2.5
70- 2000-3.0
74- 1400-3.5
76- 1000-2.5
77- 1000-2.5
82- 0200-3.0
87- 0200-2.5

1537 UT

STANFORD MAGNETOGRAM

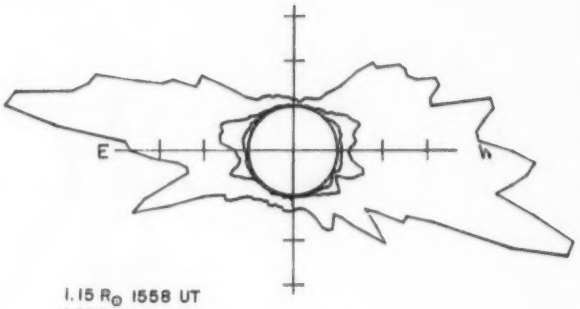
Solid - Plus; zero level
Dashed - Minus



1850 UT

DECEMBER 18, 1981 (P= 8.87, B_o=-1.31, L_o= 201.30)

SACRAMENTO PEAK Np CORONA
5303 Å

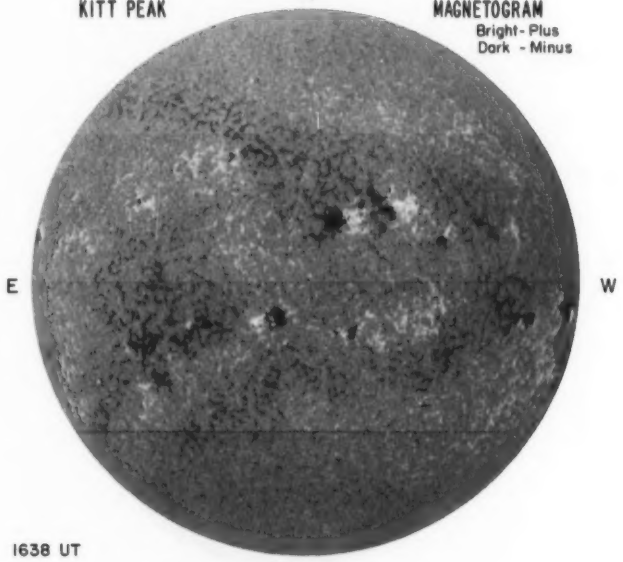


1.15 $R_\odot$ 1558 UT
1.35 $R_\odot$ 1539 UT
1.55 $R_\odot$ 1548 UT

Sp

Np

KITT PEAK Np MAGNETOGRAM
Bright - Plus
Dark - Minus



1638 UT

Sp

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =

E NO DATA W

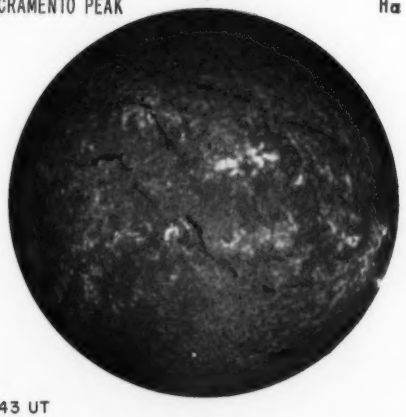
Levels
+ 5
++ 10
+++ 20
++++ 40
+++++ 80

Sp

SACRAMENTO PEAK

Np

Hα



E W

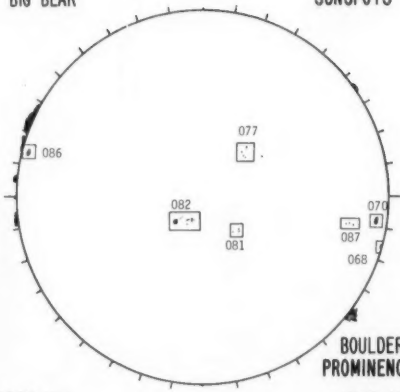
Sp

1443 UT

BIG BEAR

Np

SUNSPOTS



E W

Sp

2000 UT

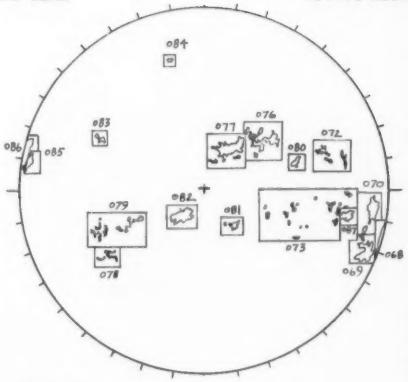
BOULDER PROMINENCES

1640 UT

BIG BEAR

Np

ACTIVE REGIONS



E W

Sp

1638 UT

FAIR | WM

68- 1000-2.5
69- 2000-2.5
70- 2200-3.0
76- 1000-2.5
77- 1000-2.5
82- 0900-3.5
85- 0900-3.0
86- 3000-3.5
87- 0300-2.5

STANFORD

Np

MAGNETOGRAM

Solid - Plus; zero level
Dashed - Minus

E

NO DATA

W

Levels
0 μT
± 50
±100
±200

Sp

77
Dec 81

DECEMBER 19, 1981 (P= 8.41, B_o=-1.44, L_o= 188.13)

SACRAMENTO PEAK Np CORONA 5303 Å

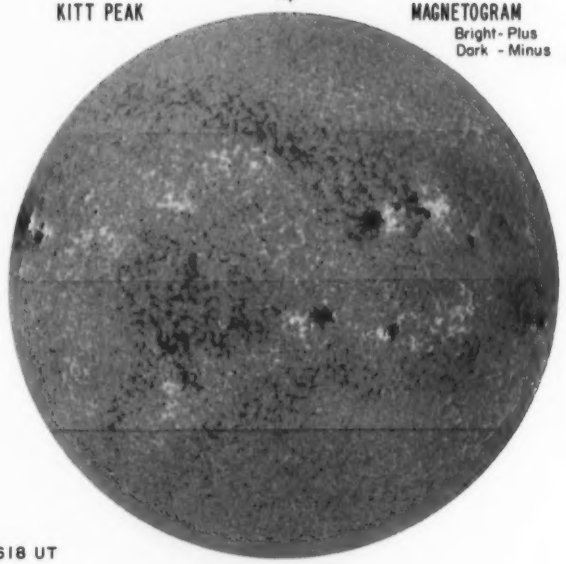
E NO DATA W

1.15 $R_\odot$
1.35 $R_\odot$
1.55 $R_\odot$

Sp

Np

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



E W

1618 UT

Sp

MT. WILSON MAGNETOGRAM
Solid-Plus
Dotted-Minus

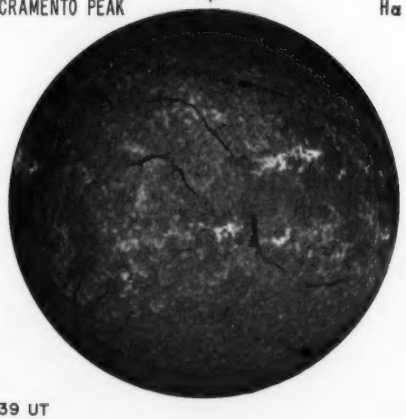
DELTAY =
DELTAX =

E NO DATA W

Levels
+ 5
+ + 10
+ + + 20
+ + + + 40
+ + + + + 80

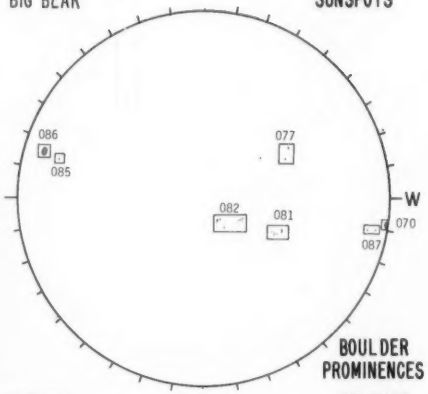
Sp

SACRAMENTO PEAK Hα



1639 UT

BIG BEAR SUNSPOTS

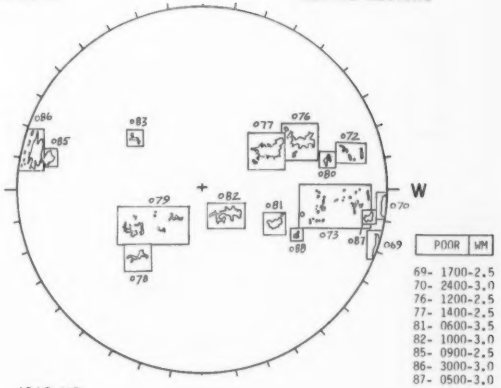


2200 UT

BOULDER PROMINENCES

NO DATA

BIG BEAR ACTIVE REGIONS

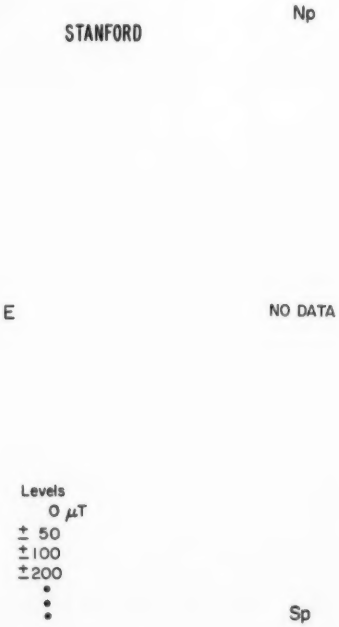


POOR | WM

69- 1700-2.5
70- 2400-3.0
76- 1200-2.5
77- 1400-2.5
81- 0600-3.5
82- 1000-3.0
85- 0900-2.5
86- 3000-3.0
87- 0500-3.0

1618 UT

STANFORD



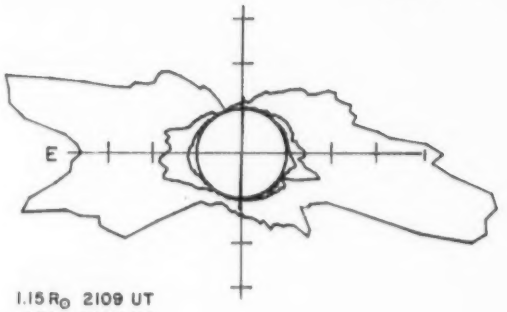
MAGNETOGRAM

Solid - Plus; zero level
Dashed - Minus

Levels
0 μT
± 50
± 100
± 200

DECEMBER 20, 1981 (P= 7.94, B_o =-1.57, L_o= 174.96)

SACRAMENTO PEAK Np CORONA
5303 Å

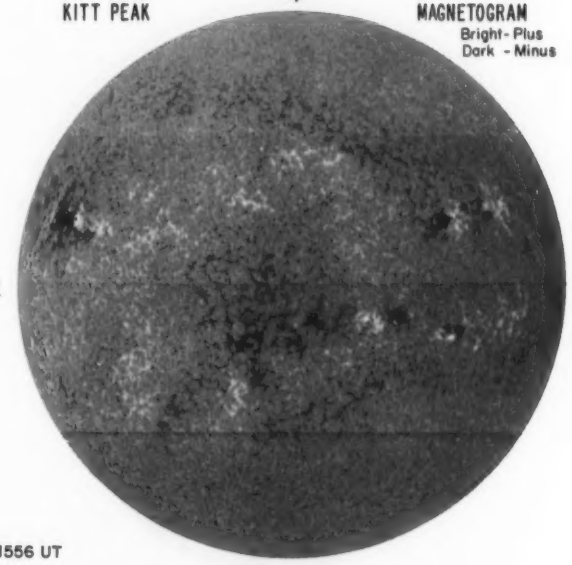


1.15 $R_\odot$ 2109 UT
1.35 $R_\odot$ 2048 UT
1.55 $R_\odot$ 2058 UT

Sp

Np

KITT PEAK Np MAGNETOGRAM
Bright- Plus
Dark - Minus



1556 UT

Sp

MT. WILSON MAGNETOGRAM
Solid-Plus
Dotted-Minus

DELTAY =
DELTAX =

E NO DATA W

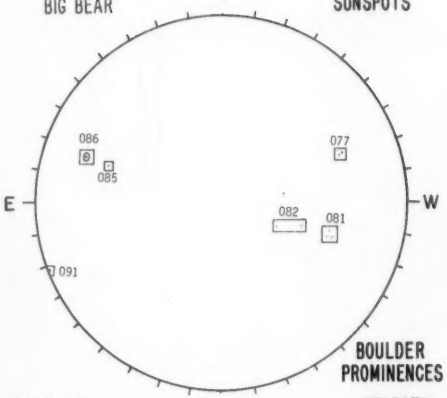
Levels
+ 5
++ 10
+++ 20
++++ 40
+++++ 80

Sp

SACRAMENTO PEAK — Hα

1658 UT

BIG BEAR — SUNSPOTS

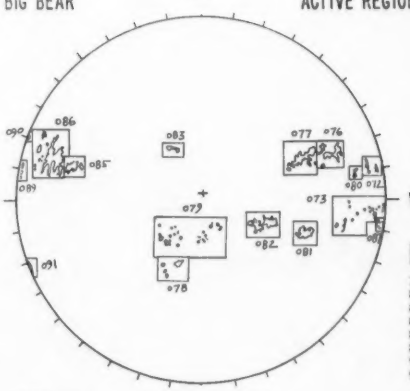


2055 UT

BOULDER PROMINENCES

NO DATA

BIG BEAR — ACTIVE REGIONS

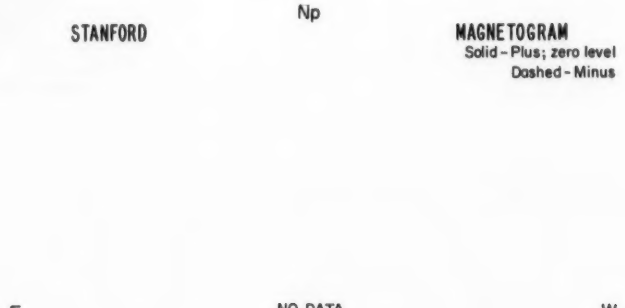


1556 UT

FAIR	WM

76- 1000-2.5
81- 0700-3.0
82- 0900-2.5
85- 0600-2.5
86- 3200-3.0
87- 0300-2.5
90- 0200-2.5
91- 0400-3.0

STANFORD



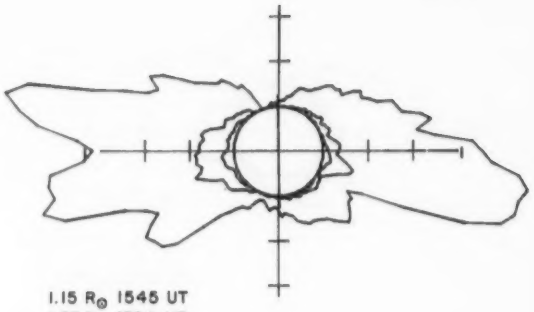
MAGNETOGRAM
Solid - Plus; zero level
Dashed - Minus

Levels
0 μT
± 50
±100
±200
•
•
•

81
Dec 81

DECEMBER 21, 1981 (P= 7.47, B_o=-1.69, L_o= 161.78)

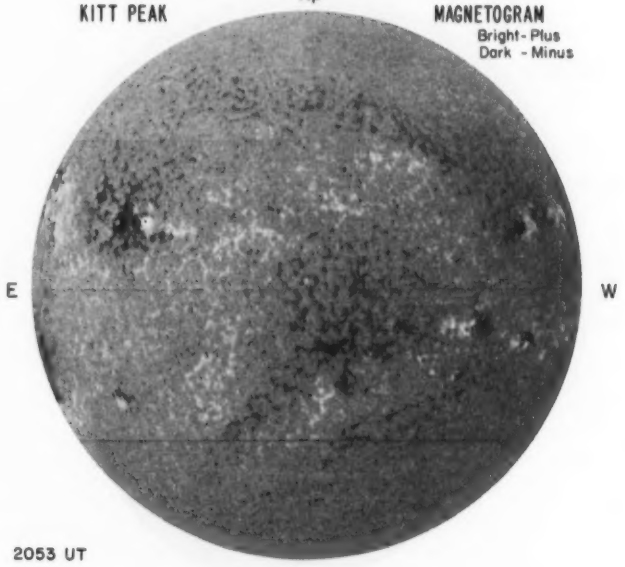
SACRAMENTO PEAK Np CORONA 5303 Å



1.15 $R_\odot$ 1545 UT
1.35 $R_\odot$ 1524 UT
1.55 $R_\odot$ 1534 UT

Sp

KITT PEAK Np MAGNETOGRAM Bright-Plus Dark-Minus



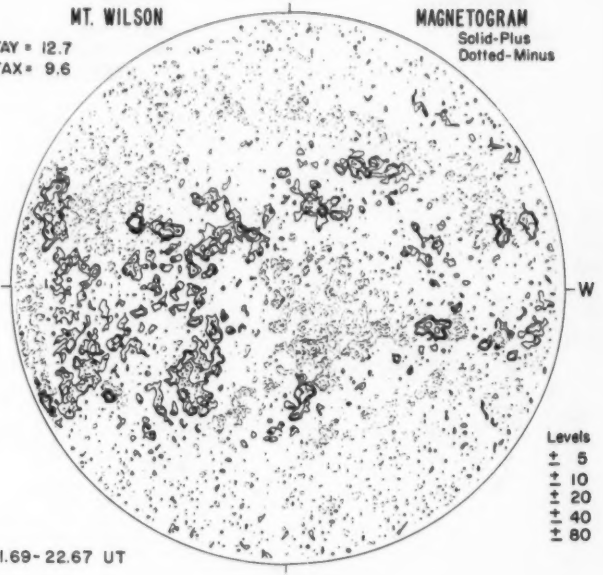
E W

2053 UT

Sp

MT. WILSON Np MAGNETOGRAM Solid-Plus Dotted-Minus

DELTAY = 12.7
DELTAX = 9.6



E W

Levels
± 5
± 10
± 20
± 40
± 80

21.69-22.67 UT

Sp

21

Np

Np

ACTIVE REGIONS

SACRAMENTO PEAK

Np

Hα

E

W

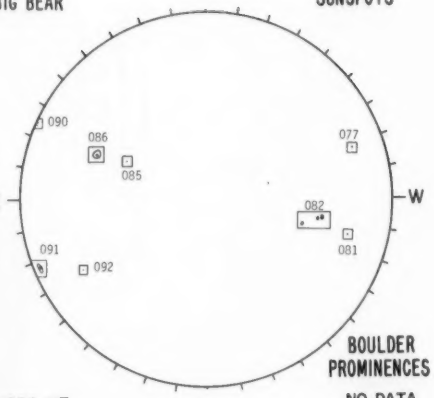
Sp

1442 UT

BIG BEAR

Np

SUNSPOTS



E

W

Sp

1830 UT

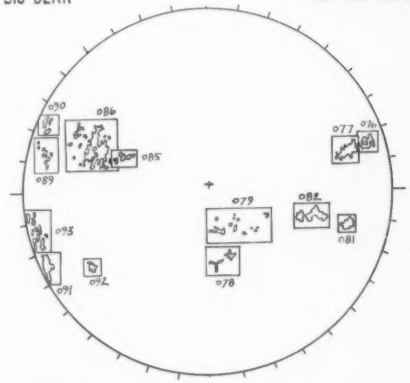
BOULDER PROMINENCES

NO DATA

BIG BEAR

Np

ACTIVE REGIONS



E

W

Sp

2053 UT

POOR	WM

76- 0800-2.5
77- 1200-2.5
81- 0700-3.0
82- 0800-2.5
85- 0300-2.5
86- 3200-3.0
91- 2000-3.5

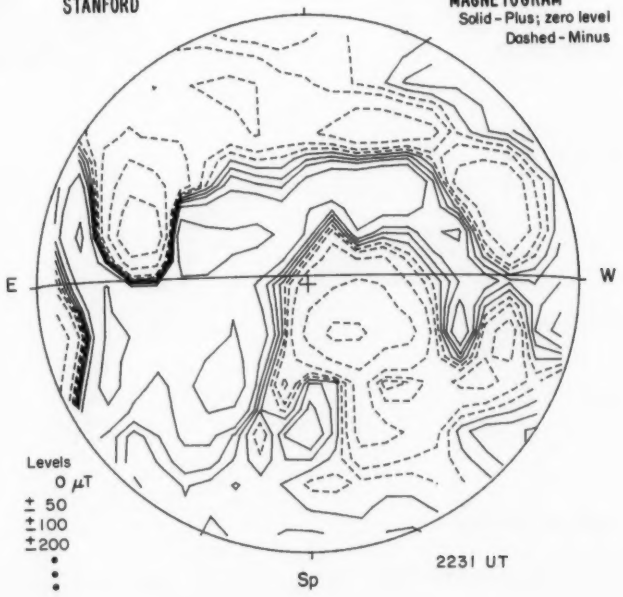
STANFORD

Np

MAGNETOGRAM

Solid - Plus; zero level

Dashed - Minus



E

W

Sp

2231 UT

Levels

0 μT

± 50

±100

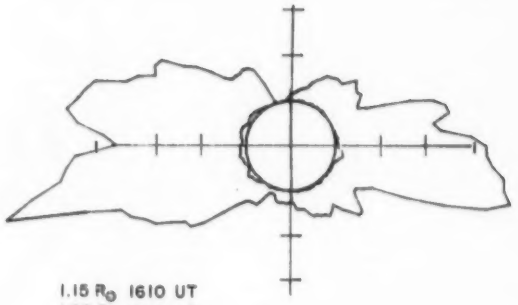
±200

•

••

DECEMBER 22, 1981 (P= 7.00, B_o=-1.82, L_o= 148.61)

SACRAMENTO PEAK Np CORONA
5303 Å

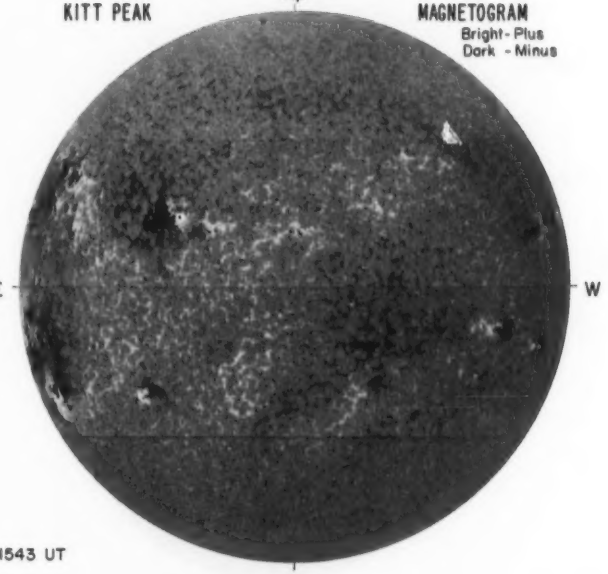


1.15 $R_\odot$ 1610 UT
1.35 $R_\odot$ 1548 UT
1.55 $R_\odot$ 1558 UT

Sp

Np

KITT PEAK Np MAGNETOGRAM
Bright-Plus
Dark -Minus



E W

1543 UT

Sp

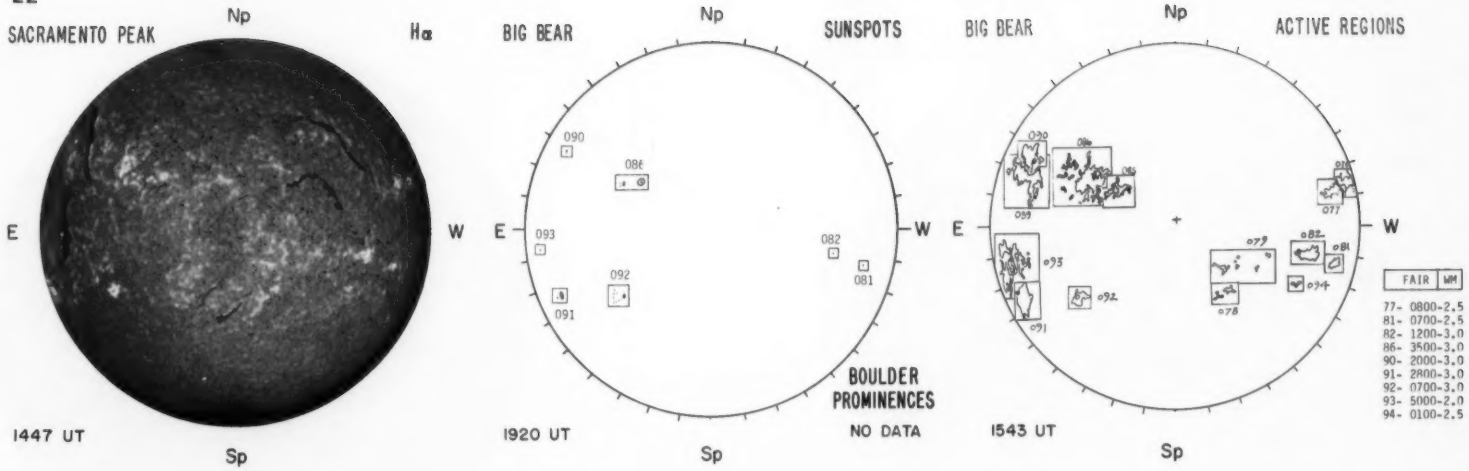
MT. WILSON MAGNETOGRAM
Solid-Plus
Dotted-Minus

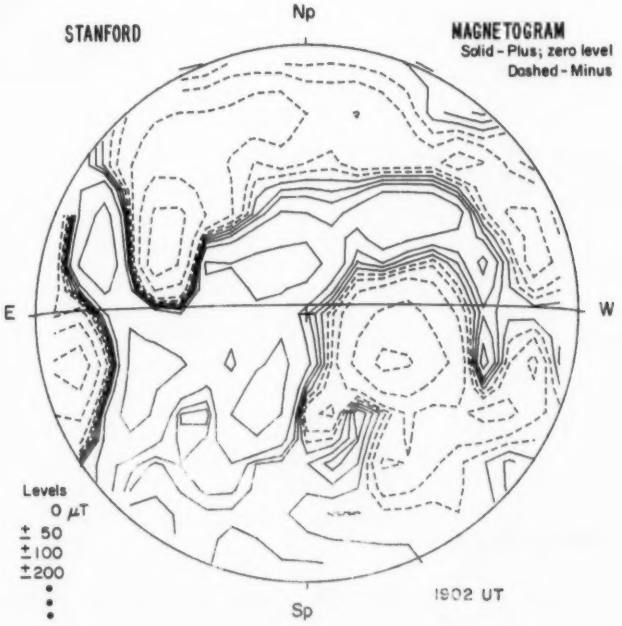
DELTAY =
DELTAX =

E NO DATA W

Levels
± 5
± 10
± 20
± 40
± 80

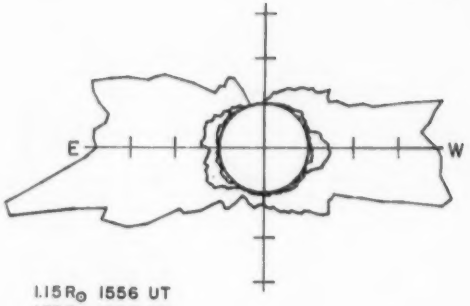
Sp


SACRAMENTO PEAK
Np
Hα
E
W
Sp
1447 UT
BIG BEAR
SUNSPOTS
090
086
093
092
091
082
081
BOULDER
PROMINENCES
NO DATA
1920 UT
BIG BEAR
ACTIVE REGIONS
FAIR WM
77- 0800-2.5
81- 0700-2.5
82- 1200-3.0
86- 3500-3.0
90- 2000-3.0
91- 2800-3.0
92- 0700-3.0
93- 5000-2.0
94- 0100-2.5
1543 UT


STANFORD
Np
MAGNETOGRAM
Solid - Plus; zero level
Dashed - Minus
E
W
Sp
Levels
0 μT
± 50
±100
±200
1902 UT

DECEMBER 23, 1981 (P= 6.52, B_o=-1.94, L_o= 135.44)

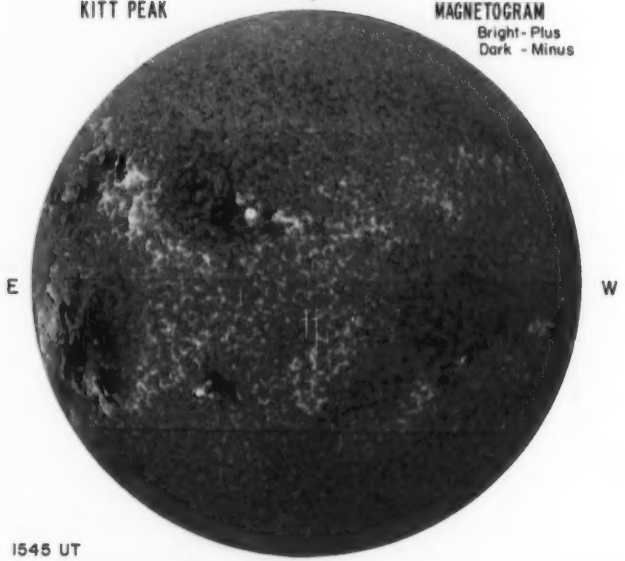
SACRAMENTO PEAK Np CORONA 5303 Å



1.15$R_\odot$ 1556 UT
1.35$R_\odot$ 1535 UT
1.55$R_\odot$ 1545 UT

Sp

KITT PEAK Np MAGNETOGRAM Bright-Plus Dark-Minus

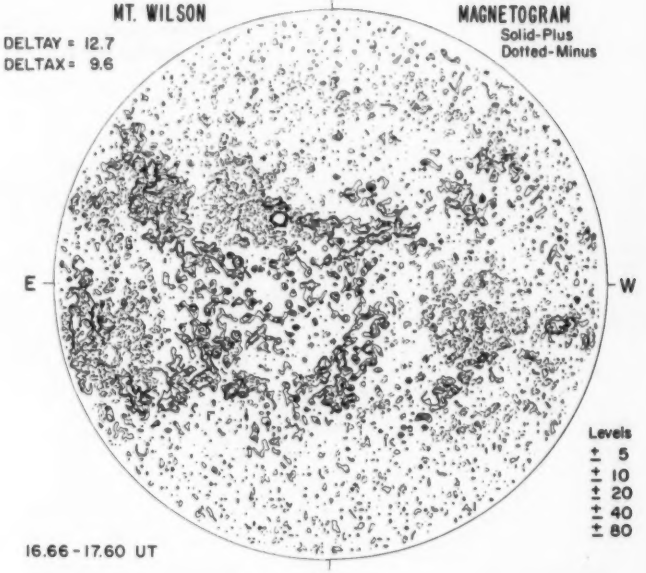


1545 UT

Sp

MT. WILSON Np MAGNETOGRAM Solid-Plus Dotted-Minus

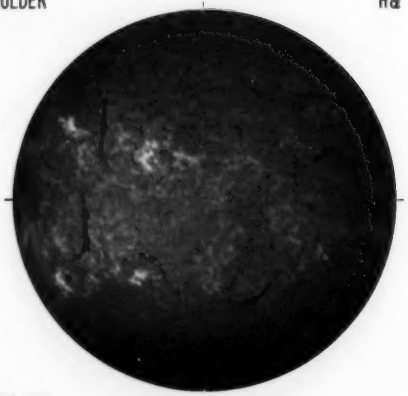
DELTAY = 12.7
DELTAX = 9.6



16.66-17.60 UT

Sp

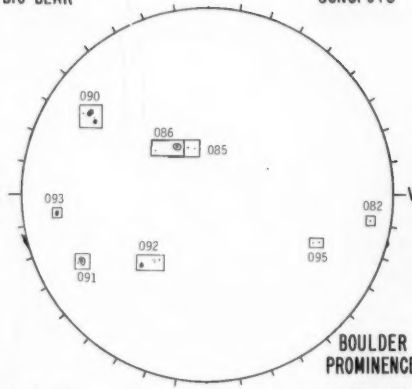
BOULDER Np Hα



E W

1535 UT Sp

BIG BEAR Np SUNSPOTS



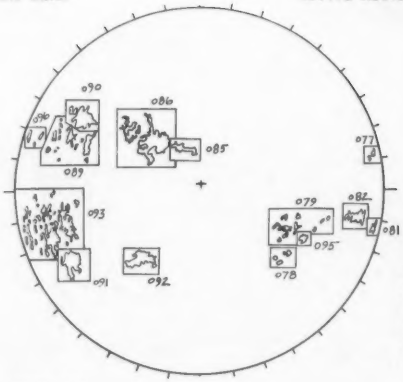
E W

1830 UT Sp

BOULDER PROMINENCES

1535 UT

BIG BEAR Np ACTIVE REGIONS



E W

1545 UT Sp

GOOD	WM

81- 0400-2.5
82- 1100-3.0
86- 3500-2.5
90- 2100-3.0
91- 2200-3.0
92- 1300-3.0
93- 5500-2.0

STANFORD Np

MAGNETOGRAM
Solid - Plus; zero level
Dashed - Minus

E NO DATA W

Levels
0 μT
± 50
±100
±200

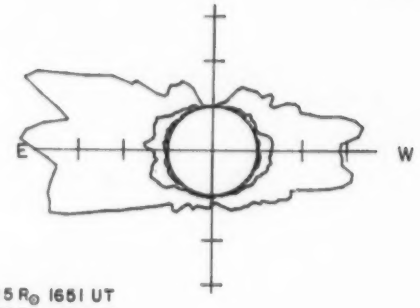
Sp

DECEMBER 24, 1981 (P= 6.05, B_o=-2.06, L_o= 122.26)

SACRAMENTO PEAK

Np

CORONA
5303 Å

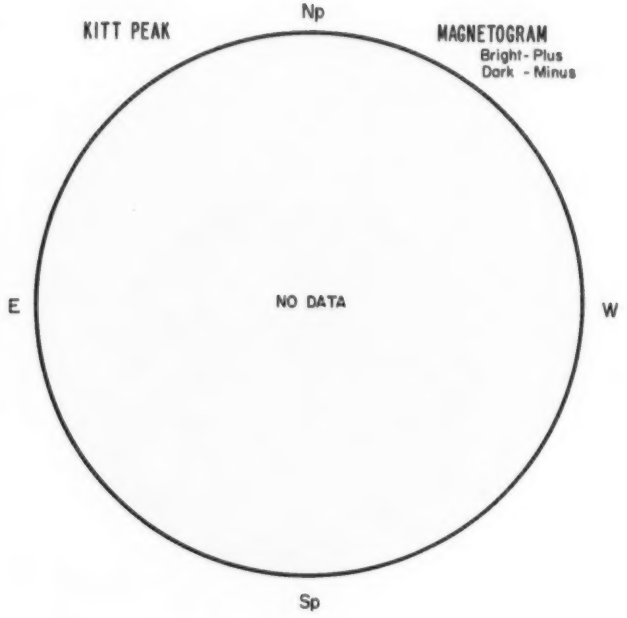


1.15 $R_\odot$ 1651 UT
1.35 $R_\odot$ 1629 UT
1.55 $R_\odot$ 1639 UT

KITT PEAK

Np

MAGNETOGRAM
Bright - Plus
Dark - Minus



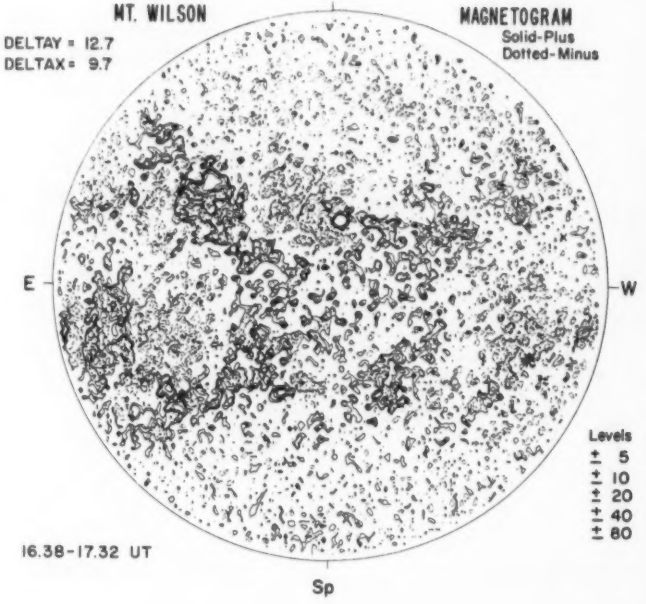
Sp

Np

MT. WILSON

DELTAY = 12.7
DELTAX = 9.7

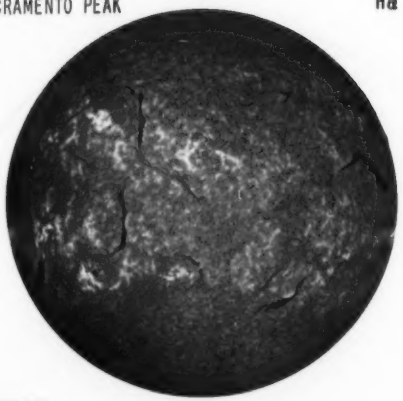
MAGNETOGRAM
Solid-Plus
Dotted-Minus



SACRAMENTO PEAK

Np

Hα



E W

1437 UT

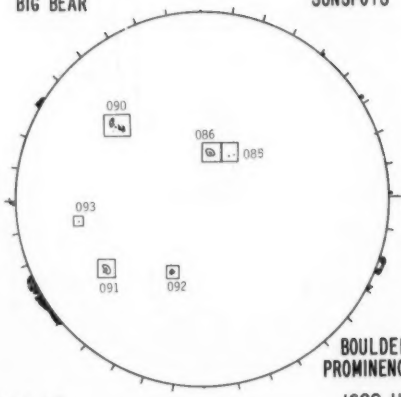
Sp

BIG BEAR

Np

SUNSPOTS

BIG BEAR



E W E W

1825 UT

Sp

BOULDER PROMINENCES

1600 UT

Np

ACTIVE REGIONS

NO DATA

W

Sp

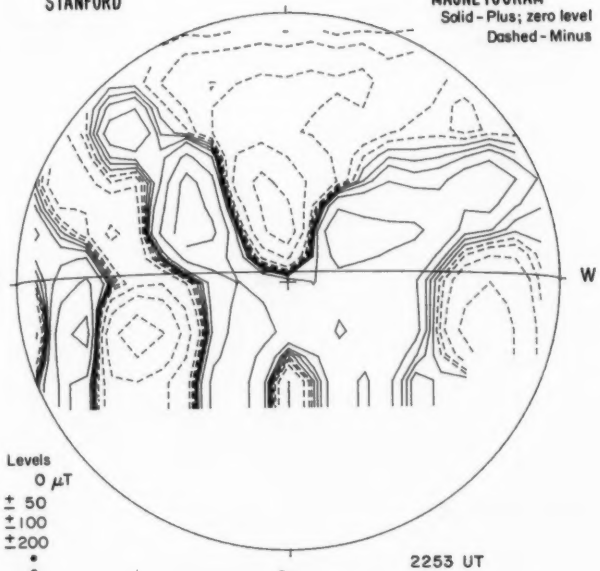
STANFORD

Np

MAGNETOGRAM

Solid - Plus; zero level

Dashed - Minus



E W

Levels

0 μT

± 50

±100

±200

2253 UT

Sp

DECEMBER 25. 1981 (P= 5.57, B_o=-2.19, L_e= 109.09)

SACRAMENTO PEAK Np CORONA 5303 Å

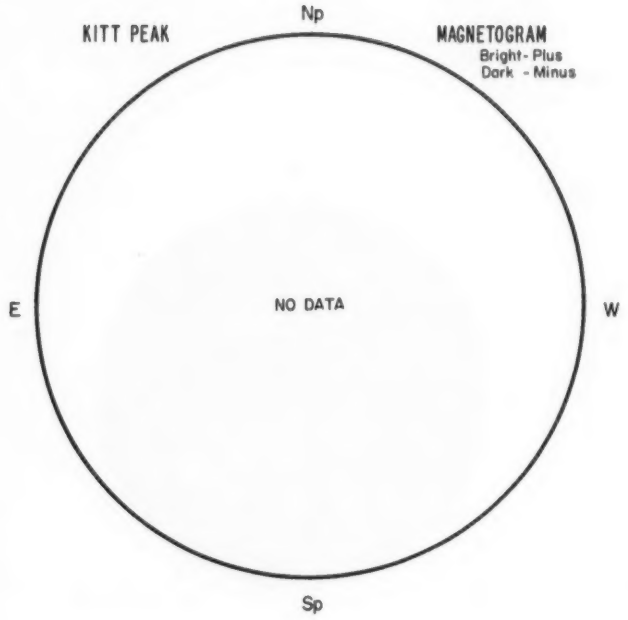
E NO DATA W

1.15 $R_\odot$
1.35 $R_\odot$
1.55 $R_\odot$

Sp

Np

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON MAGNETOGRAM
Solid-Plus
Dotted-Minus

DELTAY =
DELTAX=

E NO DATA W

Sp

Levels
± 5
± ± 10
± ± 20
± ± 40
± ± 80

25

SACRAMENTO PEAK Np Hα BIG BEAR Np SUNSPOTS BIG BEAR Np ACTIVE REGIONS

E NO DATA W E NO DATA W E NO DATA W

BOULDER
PROMINENCES
NO DATA

Sp Sp Sp

Np

STANFORD

MAGNETOGRAM
Solid - Plus; zero level
Dashed - Minus

E NO DATA W

Levels
0 μT
± 50
±100
±200
•
•
•

Sp

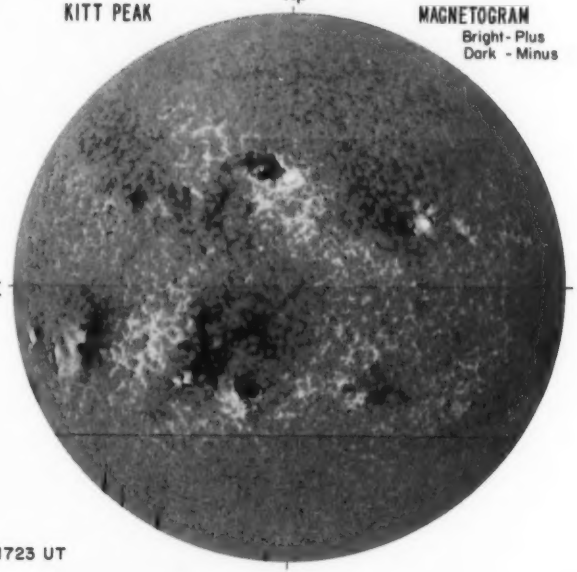
91
Dec 81

DECEMBER 26, 1981 (P= 5.09, B_o=-2.31, L_o= 95.92)

KITT PEAK

Np

MAGNETOGRAM
Bright - Plus
Dark - Minus



E

W

Sp

1723 UT

SACRAMENTO PEAK

Np

CORONA
5303 Å

E

NO DATA

W

1.15 $R_\odot$
1.35 $R_\odot$
1.55 $R_\odot$

Sp

Np

MT. WILSON

MAGNETOGRAM
Solid-Plus
Dotted-Minus

DELTAY =
DELTAX =

E

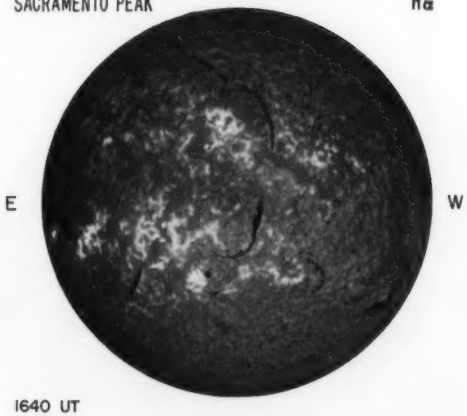
NO DATA

W

Levels
± 5
± ± 10
± ± ± 20
± ± ± ± 40
± ± ± ± ± 80

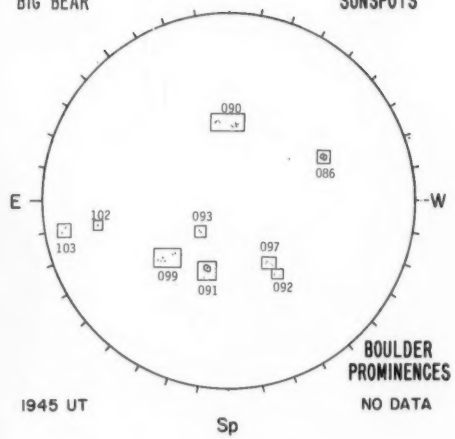
Sp

SACRAMENTO PEAK Hα



1640 UT

BIG BEAR SUNSPOTS

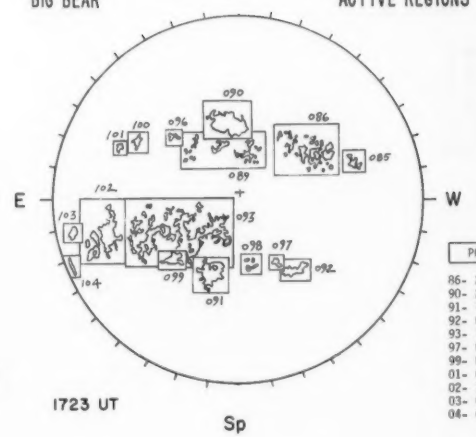


1945 UT

BOULDER PROMINENCES

NO DATA

BIG BEAR ACTIVE REGIONS

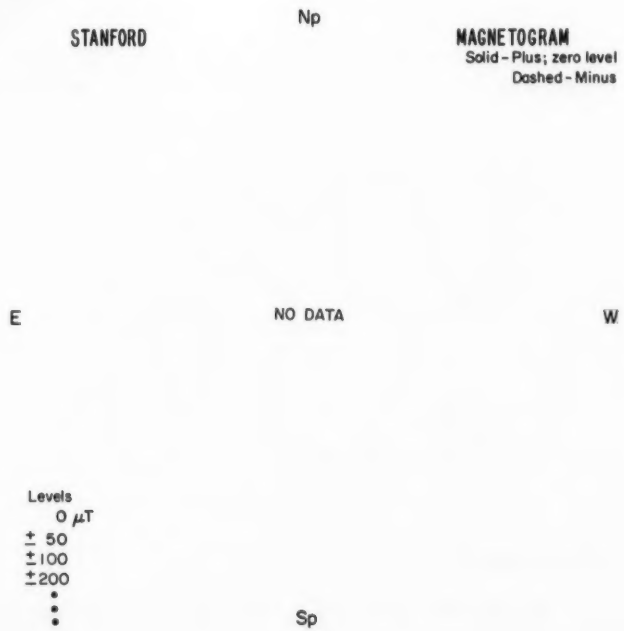


1723 UT

POOR	WM

86- 2800-2.5
90- 2700-3.0
91- 1800-3.0
92- 0900-2.5
93- 7000-2.5
97- 0300-2.5
99- 0800-3.0
01- 0200-2.5
02- 3700-3.0
03- 0600-3.0
04- 0500-2.5

STANFORD



MAGNETOGRAM
Solid - Plus; zero level
Dashed - Minus

NO DATA

Levels
0 μT
± 50
±100
±200
•
•
•

DECEMBER 27, 1981 (P= 4.61, B_o=-2.43, L_o= 82.75)

SACRAMENTO PEAK Np CORONA 5303 Å

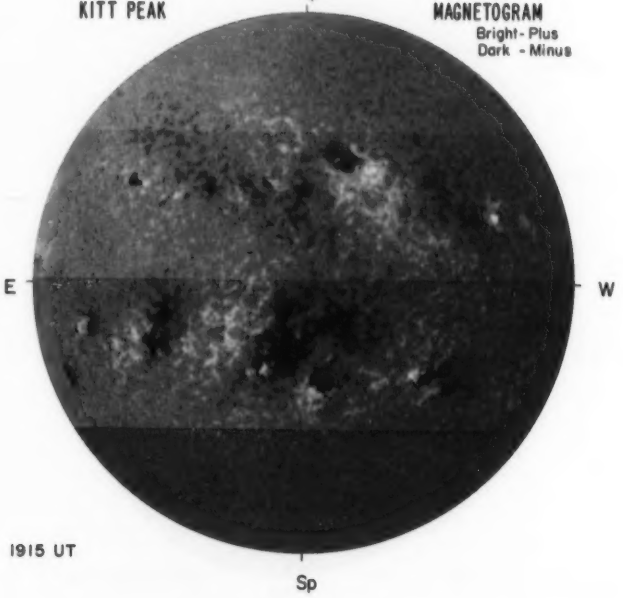
E NO DATA W

1.15 $R_\odot$
1.35 $R_\odot$
1.55 $R_\odot$

Sp

Np

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1915 UT

MT. WILSON

DELTAY =
DELTAX =

MAGNETOGRAM
Solid-Plus
Dotted-Minus

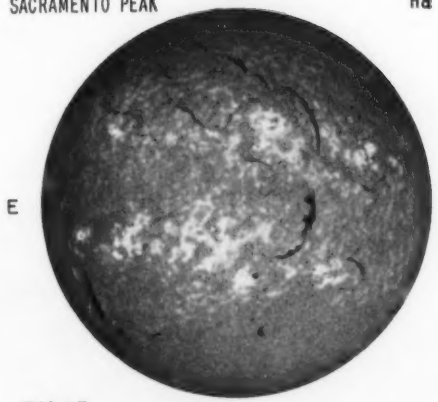
E NO DATA W

Levels
+ 5
++ 10
+++ 20
++++ 40
+++++ 80

Sp

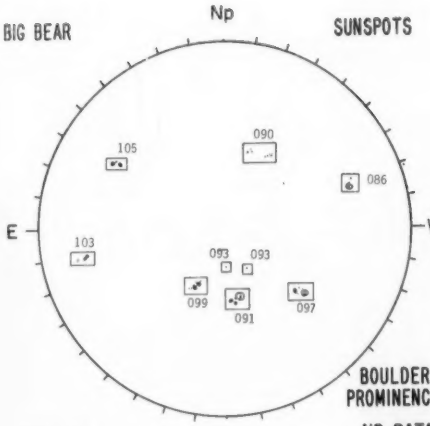
27

SACRAMENTO PEAK Hα



1740 UT

BIG BEAR SUNSPOTS

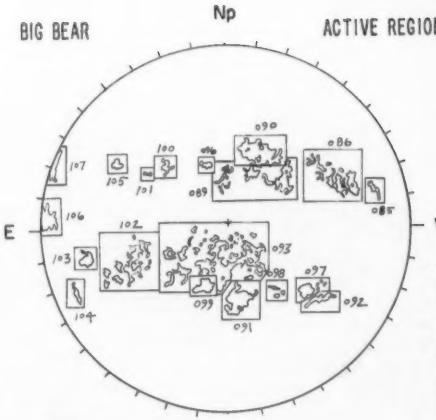


1920 UT

BOULDER PROMINENCES

NO DATA

BIG BEAR ACTIVE REGIONS



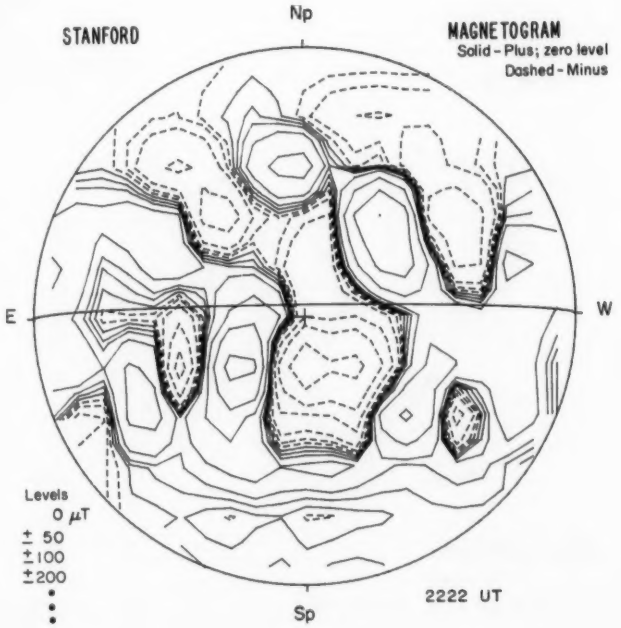
1915 UT

V POOR	WM

86- 2700-2.5
90- 2700-3.5
91- 1800-3.5
92- 0600-2.5
93- 7000-2.5
97- 0800-3.5
99- 0800-2.5
02- 2800-2.5
03- 0900-3.5
05- 0500-3.5
07- 1500-3.5

STANFORD MAGNETOGRAM

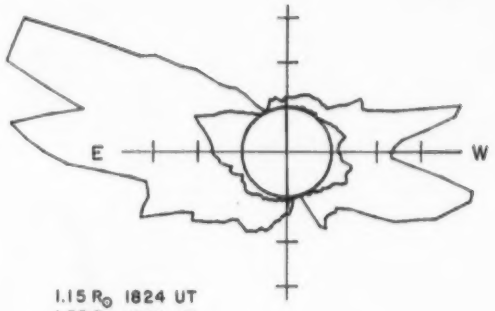
Solid - Plus; zero level
Dashed - Minus



2222 UT

DECEMBER 28, 1981 (P= 4.12, B_o=-2.55, L_o= 69.58)

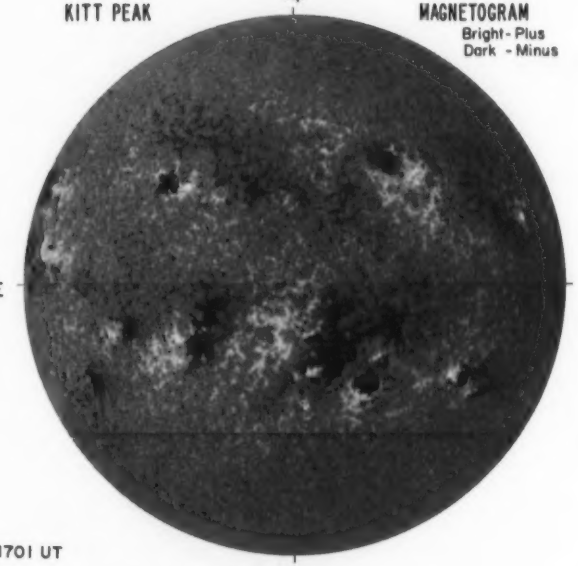
SACRAMENTO PEAK Np CORONA
5303 Å



1.15 $R_\odot$ 1824 UT
1.35 $R_\odot$ 1836 UT
1.55 $R_\odot$

Sp

KITT PEAK Np MAGNETOGRAM
Bright-Plus
Dark - Minus

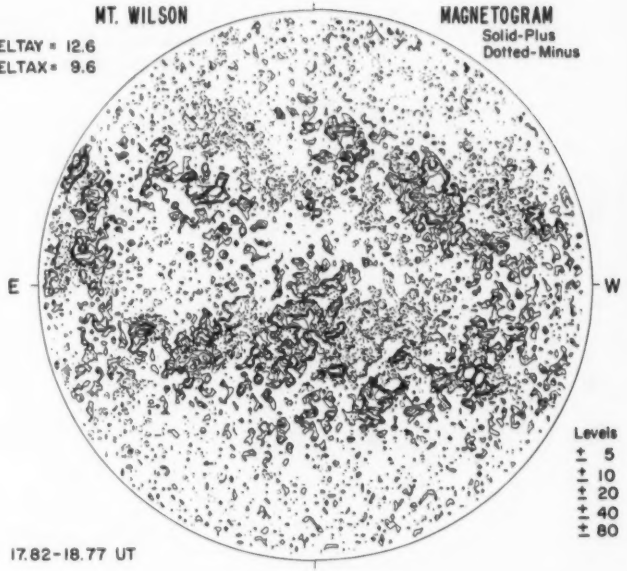


1701 UT

Sp

Np MT. WILSON MAGNETOGRAM
Solid-Plus
Dotted-Minus

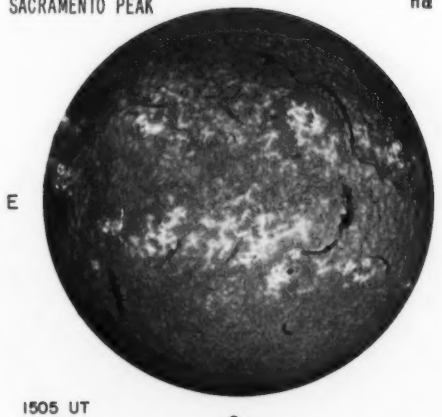
DELTAY = 12.6
DELTAX= 9.6



17.82-18.77 UT

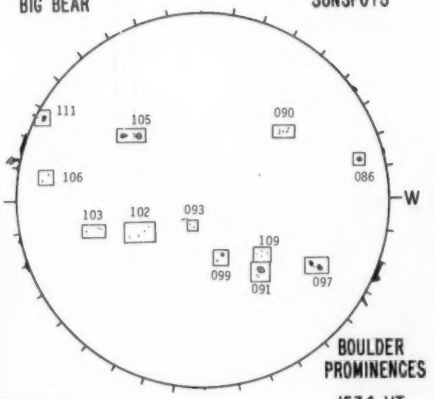
Sp

SACRAMENTO PEAK Hα



1505 UT

BIG BEAR SUNSPOTS

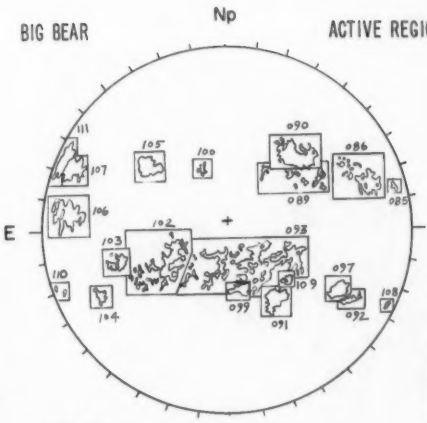


1950 UT

BOULDER PROMINENCES

1534 UT

BIG BEAR ACTIVE REGIONS



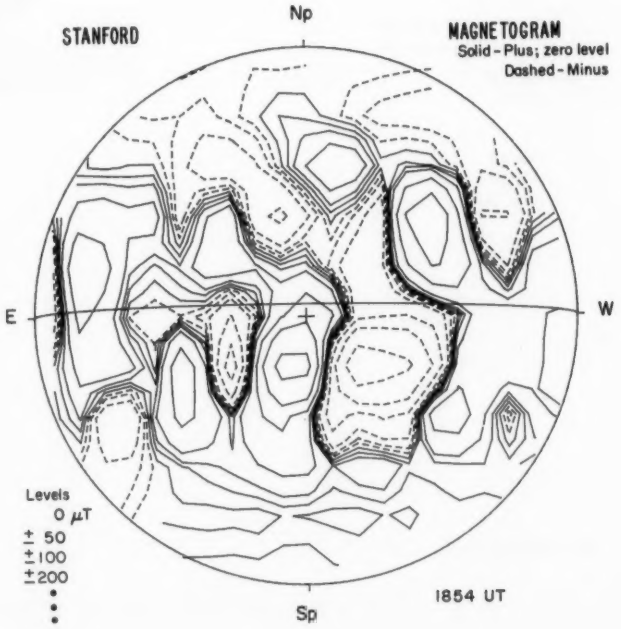
1701 UT

FAIR	WM

86- 3000-2.5
90- 3000-3.0
91- 1800-3.0
92- 0500-2.5
93- 6600-2.5
97- 1200-3.0
99- 0700-3.0
02- 2900-2.5
03- 0900-3.0
05- 1700-3.5
06- 3300-2.5
07- 2500-2.5
08- 0300-2.5
09- 0200-2.5
11- 3000-3.0

STANFORD MAGNETOGRAM

Solid - Plus; zero level
Dashed - Minus



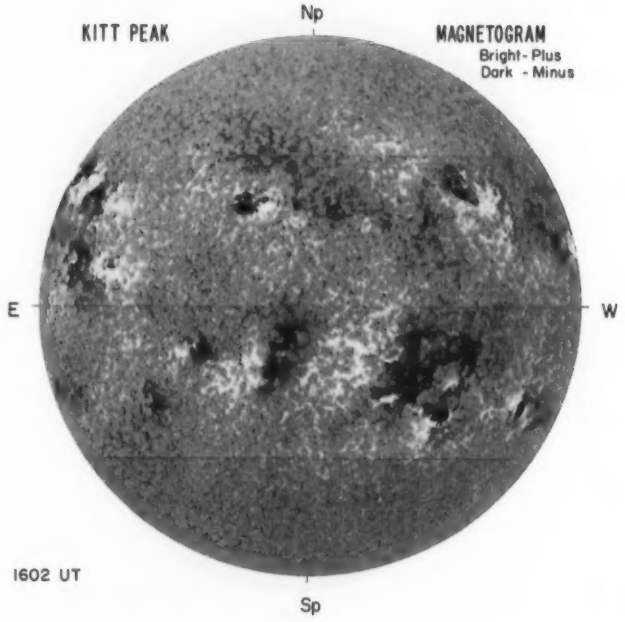
1854 UT

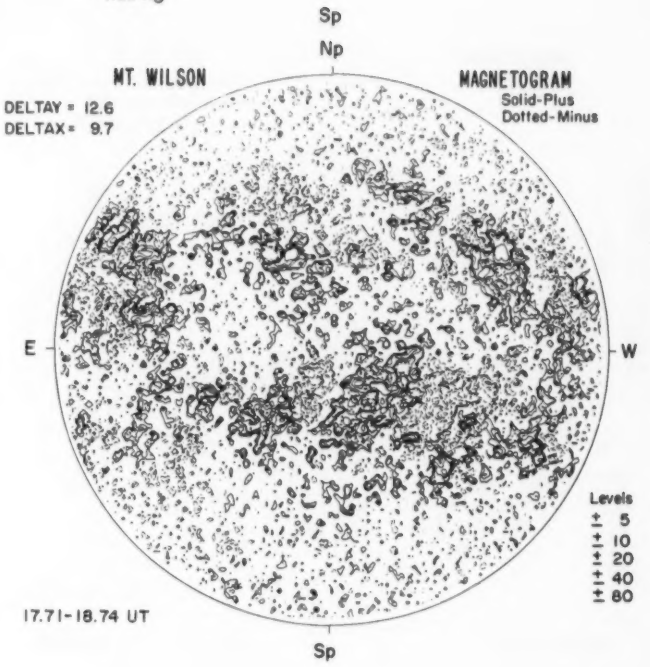
DECEMBER 29, 1981 (P= 3.64, B_o = -2.67, L_o = 56.41)

SACRAMENTO PEAK Np CORONA 5303 Å

E NO DATA W

1.15 $R_\odot$
1.35 $R_\odot$
1.55 $R_\odot$



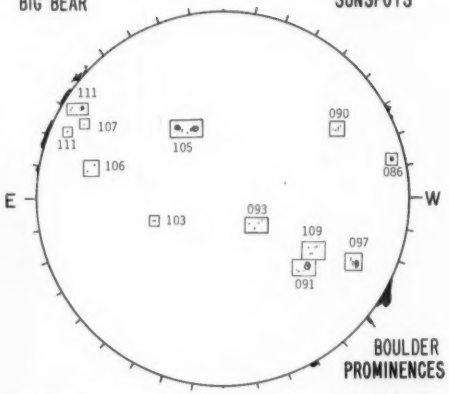


29

SACRAMENTO PEAK — Hα

1531 UT

BIG BEAR — SUNSPOTS

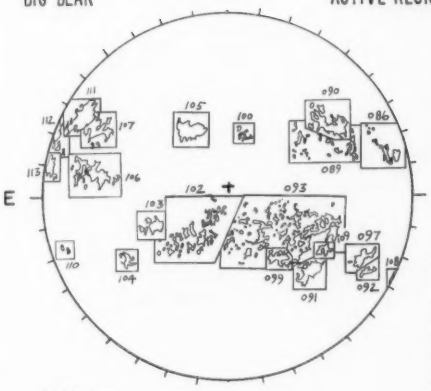


1745 UT

BOULDER PROMINENCES

2024 UT

BIG BEAR — ACTIVE REGIONS

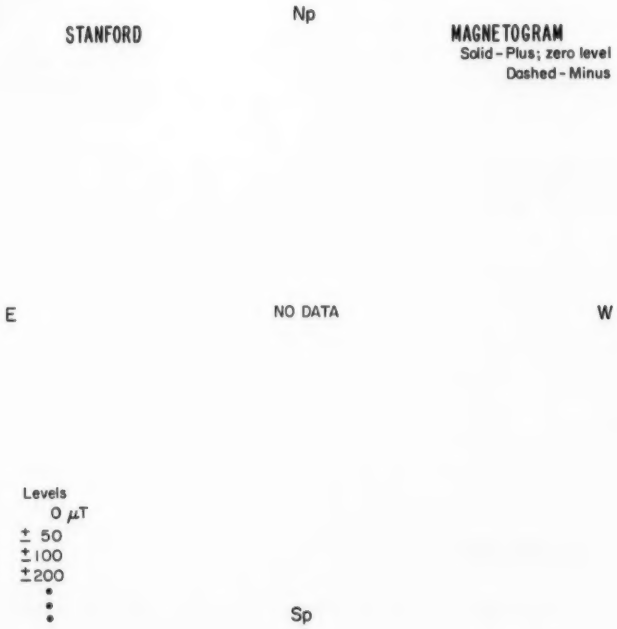


1602 UT

FAIR	WM

86- 2500-2.5
90- 2700-3.0
91- 1800-3.0
92- 0300-2.5
93- 6800-2.5
97- 1300-3.0
99- 0700-2.5
02- 2600-2.5
03- 0900-2.5
05- 2000-3.0
06- 3300-2.5
07- 2300-2.5
08- 0300-3.0
09- 0300-2.5
11- 3700-3.0
13- 2300-2.5

STANFORD

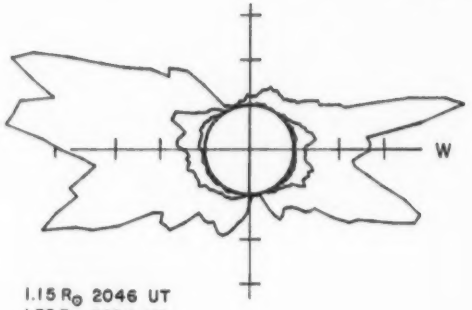


MAGNETOGRAM
Solid - Plus; zero level
Dashed - Minus

Levels
0 μT
± 50
±100
±200
•
•
•

DECEMBER 30, 1981 (P= 3.15, B_o =-2.79, L_o = 43.24)

SACRAMENTO PEAK Np CORONA
5303 Å

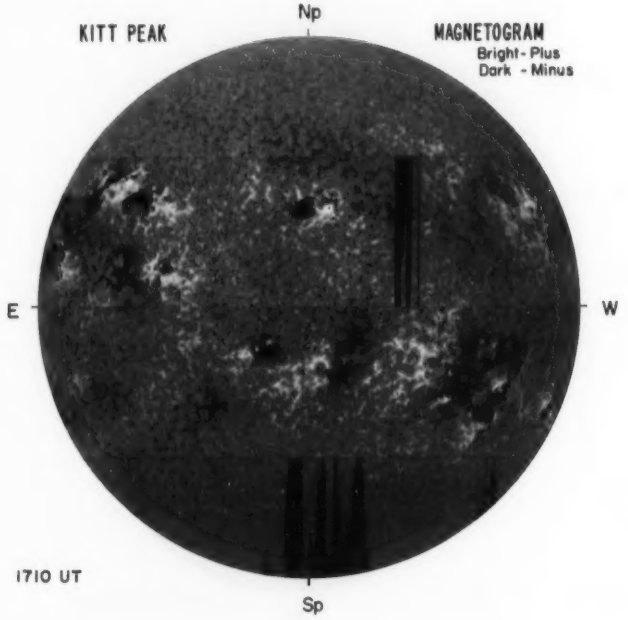


1.15 $R_\odot$ 2046 UT
1.35 $R_\odot$ 2025 UT
1.55 $R_\odot$ 2035 UT

Sp

Np

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1710 UT

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =

E NO DATA W

Sp

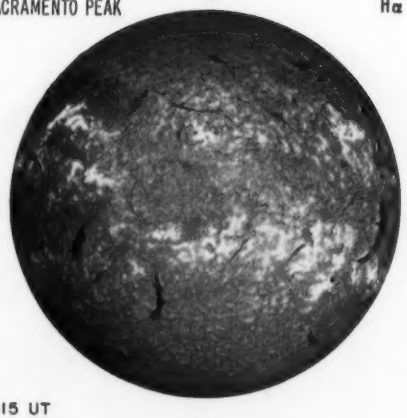
Levels
± 5
± 10
± 20
± 40
± 80

30

SACRAMENTO PEAK

Np

Hα



E W

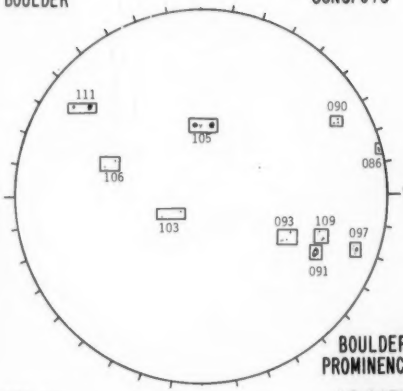
1515 UT

Sp

BOULDER

Np

SUNSPOTS



E W

1600 UT

Sp

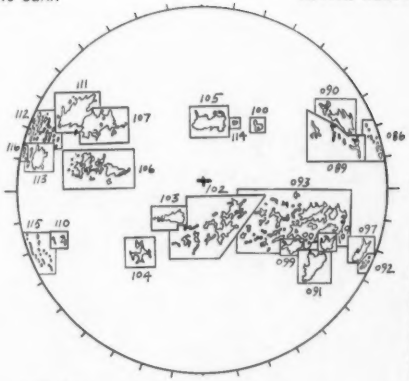
BOULDER PROMINENCES

NO DATA

BIG BEAR

Np

ACTIVE REGIONS



E W

1710 UT

Sp

POOR	WM
86- 1700-2.5	
90- 2700-3.0	
91- 2000-3.0	
93- 7200-2.5	
97- 1300-3.5	
99- 0700-3.0	
02- 3000-2.5	
03- 0800-2.5	
05- 1700-3.5	
06- 2500-2.5	
09- 0600-3.0	
11- 4000-3.0	
16- 0200-2.5	

STANFORD

Np

MAGNETOGRAM

Solid - Plus; zero level

Dashed - Minus

E

NO DATA

W

Levels

0 μT

± 50

±100

±200

•

•

•

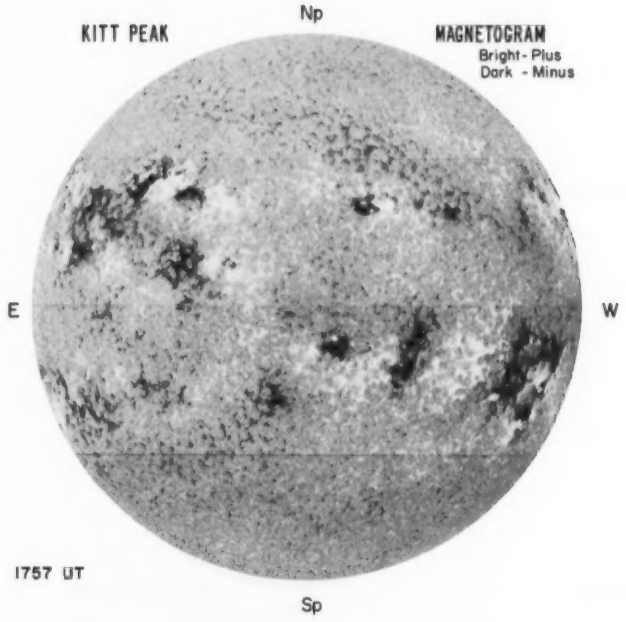
Sp

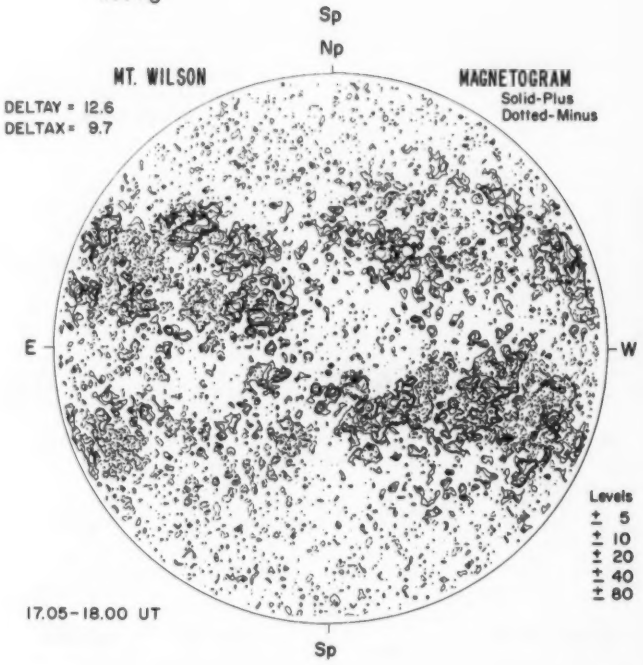
DECEMBER 31, 1981 (P= 2.67, B_o = -2.91, L_o = 30.06)

SACRAMENTO PEAK Np CORONA
5303 Å

E NO DATA W

1.15 $R_\odot$
1.35 $R_\odot$
1.55 $R_\odot$





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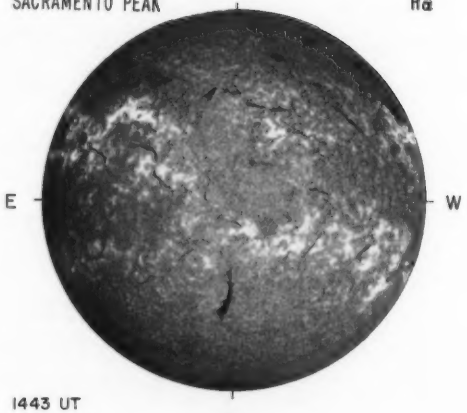
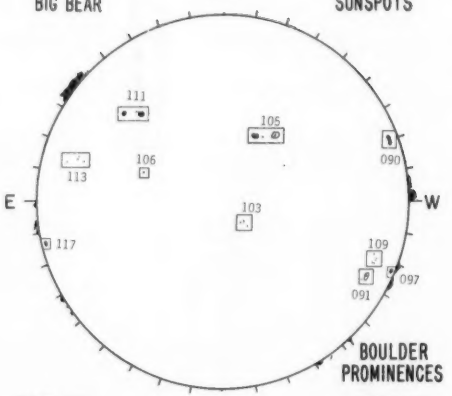
SACRAMENTO PEAK Hα



1443 UT

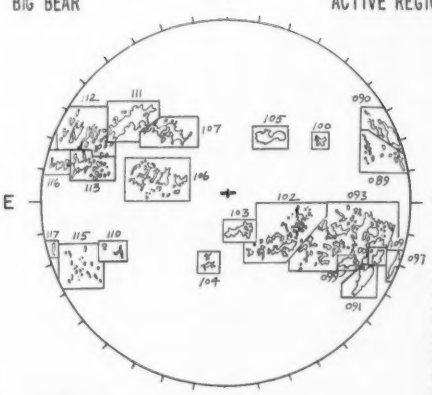
BIG BEAR SUNSPOTS



1850 UT 1700 UT

BOULDER PROMINENCES

BIG BEAR ACTIVE REGIONS

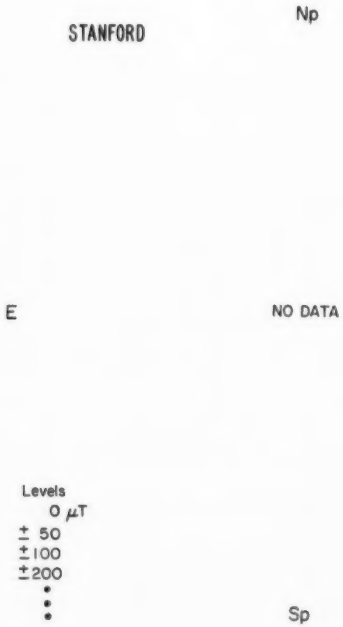


1757 UT

FAIR	WM

90- 3000-3.0
91- 2000-3.0
93- 7500-2.5
97- 1300-3.5
99- 0600-3.0
02- 2700-2.5
03- 0800-2.5
05- 1500-3.5
06- 2300-2.5
09- 0400-2.5
11- 3500-3.0
13- 2000-2.5
16- 0900-2.5
17- 0300-2.5

STANFORD



MAGNETOGRAM
Solid - Plus; zero level
Dashed - Minus

NO DATA

Levels
0 μT
± 50
±100
±200

REGIONS OF SOLAR ACTIVITY

DECEMBER 1981

HALE REGION 18039 CMP DATE 1.2 RETURN OF REGION 17969 ROTATION 2

				CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	11	24	18039	S10 E85	64	2000	3.5		22811	S07 E80	68	(AP)	4	H	280	1	HHX
81	11	25	18039	S10 E67	67	7000	3.5		22811	S08 E71	64	(B)	4	H	710	18	EKI
81	11	26	18039	S11 E60	62	9000	4.0			S09 E62				H	680	24	FHI
81	11	27	18039							S09 E48				B	770	22	EKI
81	11	28	18039							S08 E35				B	660	45	FKI
81	12	1	18039	S12 W07	63	9000	3.5			S08 W03				H	580	46	FHI
81	12	2	18039	S11 W20	63	9000	3.5		22818	S13 W13	56	(B)	4				
81	12	2	18039	S11 W20	63	9000	3.5		22817	S15 W27	70	(AP)	3				
81	12	2	18039	S11 W20	63	9000	3.5		22811	S08 W20	63	(BP)	5	H	460	38	FHI
81	12	2	18039	S11 W20	63	9000	3.5		22816	S11 W33	76	(AP)	3				
81	12	3	18039	S11 W33	63	9300	3.5		22811	S08 W36	65	(BP)	5				
81	12	3	18039	S11 W33	63	9300	3.5		22818	S13 W26	55	(B)	5				
81	12	3	18039	S11 W33	63	9300	3.5		22816	S12 W47	76	AP	1				
81	12	4	18039						22818	S13 W41	57	(BP)	4				
81	12	4	18039						22811	S09 W50	66	(BP)	5				
81	12	5	18039						22818	S13 W56	58	(AP)	3	R	410	3	EKO
81	12	5	18039						22811	S09 W66	68	(AP)	4	R	410	3	EKO
81	12	6	18039	S11 W73	63	9000	3.0		22818	S13 W72	58	AP	1				
81	12	6	18039	S11 W73	63	9000	3.0		22811	S09 W80	66	AP)	2				
81	12	7	18039	S11 W86	62	5500	3.0										

HALE REGION 18045 CMP DATE 1.4

				CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	1	18045	N06 W04	60	100	1.0										

HALE REGION 18040 CMP DATE 1.8 RETURN OF REGION 17980 ROTATION 2

				CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	11	25	18040	N13 E71	63	300	1.5			N08 E71				B	310	7	EHO
81	11	26	18040	N14 E63	59	800	1.5										
81	11	28	18040							N14 E31				L		2	BXO
81	12	1	18040	N14 E02	54	300	1.0			N14 E07				R	10	2	BXO
81	12	2	18040	N14 W12	55	300	1.0										
81	12	3	18040	N15 W24	54	200	1.0										

HALE REGION 18046 CMP DATE 1.8

				CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	1	18046	S18 E01	55	100	1.5										
81	12	2	18046	S18 W12	55	200	2.5		22819	S18 W13	56	(B)	4				
81	12	3	18046	S18 W26	56	200	2.5		22819	S17 W26	55	(B)	2				
81	12	4	18046						22819	S17 W40	56	(B)	3				

HALE REGION 18047 CMP DATE 3.0 NEW, IN LOCATION OF REGION 17982

				CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	1	18047	S13 E18	38	700	3.0			S14 E17				H	30	5	CAO
81	12	2	18047	S13 E05	38	700	3.0		22820	S15 E04	39	(AP)	3	H	10	5	BXO
81	12	2	18047	S13 E05	38	700	3.0		22821	S20 E08	35	(AF)	2	L	20	5	CRO
81	12	3	18047	S14 W08	38	500	3.0		22820	S15 W09	38	(AP)	3				
81	12	4	18047						22820	S16 W22	38	(AP)	3				
81	12	5	18047						22840	S14 W27	29	(B)	3	P	10	3	BXO
81	12	5	18047						22820	S16 W36	38	AP	1	P	10	3	BXO

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HALE REGION 18047 (CONT) CMP DATE 3.0 NEW, IN LOCATION OF REGION 17982

				CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	6	18047	S13 W44	34	200	2.5		22843	S13 W47	33	(BY)	3				
81	12	7	18047	S13 W57	33	400	3.5		22843	S15 W56	33	(BP)	3				
81	12	8	18047	S13 W70	34	1500	3.5		22843	S15 W69	32	(B)	3	H	160	7	DAO
81	12	9	18047	S14 W83	33	1500	3.5		22843	S15 W80	30	AF	2	H	10	1	AXX

HALE REGION 18048 CMP DATE 3.9

				CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	1	18048	N07 E29	27	500	3.0										
81	12	2	18048	N07 E16	27	500	3.0		22822	N07 E16	27	(AP)	3	H		1	AXX
81	12	3	18048	N07 E03	27	200	2.0										

HALE REGION 18049 CMP DATE 5.3 RETURN OF REGION 17983 ROTATION 3

				CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	1	18049	S17 E47	9	1600	3.0			S19 E49				H	20	4	BXO
81	12	2	18049	S17 E34	9	1500	3.0		22826	S16 E51	352	(AP)	2	M	60	3	BXO
81	12	2	18049	S17 E34	9	1500	3.0		22824	S19 E35	8	(B)	3	H	20	8	BXO
81	12	3	18049	S17 E21	9	1500	3.0		22824	S20 E20	9	(BP)	3				
81	12	4	18049						22824	S20 E07	9	B	4				
81	12	5	18049						22824	S20 W04	6	(BF)	4	R	40	7	CAO
81	12	6	18049	S17 W18	8	1300	3.0		22824	S20 W20	6	(B)	3				
81	12	7	18049	S17 W32	8	1800	3.0		22824	S20 W29	6	(B)	2	H	20	9	BXO
81	12	8	18049	S18 W46	10	1500	2.5			S20 W37				L	10	4	BXO
81	12	9	18049	S18 W57	7	1700	2.5										
81	12	10	18049	S19 W70	7	1300	2.0										

HALE REGION 18050 CMP DATE 5.3 RETURN OF REGION 17984 ROTATION 2

				CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	1	18050	S02 E47	9	600	2.5			S03 E47				H		1	AXX
81	12	2	18050	S03 E33	10	500	3.0		22823	S04 E33	10	(BP)	4	H	20	6	BXO
81	12	3	18050	S03 E19	11	600	2.0		22823	S04 E19	10	(BP)	4				
81	12	4	18050						22823	S04 E06	10	AP	3				
81	12	5	18050						22823	S03 W08	10	(B)	3	R	10	1	AXX
81	12	6	18050	S03 W17	7	300	1.0		22844	S02 W08	354	(AF)	2				
81	12	6	18050	S03 W17	7	300	1.0		22823	S04 W23	9	(AP)	2				
81	12	7	18050	S03 W31	7	100	1.0		22823	S04 W33	10	(AP)	2				
81	12	8	18050	S03 W43	7	100	1.0										
81	12	9	18050	S03 W59	9	100	1.0										
81	12	10	18050	S04 W73	10	100	1.0										

HALE REGION 18051 CMP DATE 5.9

				CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	1	18051	N21 E55	1	2000	3.0			N20 E56				H	220	11	DAO
81	12	2	18051	N22 E43	0	2000	3.5		22825	N20 E42	1	(BY)	4	H	130	7	DAO
81	12	3	18051	N21 E30	0	1800	3.0		22825	N20 E30	359	(B)	4				
81	12	4	18051						22825	N19 E18	358	B	4				
81	12	5	18051						22825	N20 E04	358	(B)	2	R	50	11	BXO
81	12	6	18051	N21 W09	359	1300	3.0		22825	N18 W11	357	(B)	3				
81	12	7	18051	N21 W22	358	1100	2.5		22825	N20 W21		(B)	3				
81	12	8	18051	N20 W35	359	900	2.5		22825	N18 W40	3	(AP)	3				
81	12	9	18051	N21 W49	359	900	2.0		22825	N22 W49	359	B	3				
81	12	10	18051	N20 W62	359	700	2.0										

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HALE REGION 18051 (CONT) CMP DATE 5.9

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	11	18051					22825	N20 W78	1	X	1				

HALE REGION 18052 CMP DATE 6.7

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	1	18052	N07 E67	349	3500	3.0		N04 E67				H	170	11	EAO
81	12	2	18052	N07 E54	349	3500	3.0	22827	N06 E52	351	(B)	5	H	260	22	DAI
81	12	2	18052	N07 E54	349	3500	3.0	22828	N09 E60	343	(AF)	4	H	260	22	DAI
81	12	3	18052	N07 E41	349	4000	3.0	22827	N06 E40	349	(BY)	5				
81	12	4	18052					22827	N04 E25	351	BY	5				
81	12	5	18052					22827	N05 E10	352	(B)	5	R	220	17	DKI
81	12	6	18052	N07 E01	349	3500	3.5	22827	N04 W05	351	(BP)	5				
81	12	7	18052	N07 W13	349	2900	3.0	22827	N04 W16	353	(BY)	5				
81	12	8	18052	N07 W27	351	3300	2.5	22827	N04 W30	353	(D)	5	H	310	40	DHO
81	12	9	18052	N07 W40	350	3800	3.0	22827	N03 W45	355	BY	5	H	330	15	DHO
81	12	10	18052	N06 W54	351	3500	3.0									
81	12	11	18052					22827	N03 W71	354	AP	4				

HALE REGION 18075 CMP DATE 7.0

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	10	18075	N09 W48	345	300	2.5									

HALE REGION 18062 CMP DATE 7.1

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	3	18062	N23 E47	343	300	1.5									
81	12	4	18062					22838	N21 E34	342	X	2				
81	12	6	18062	N23 E06	344	200	1.0									
81	12	7	18062	N23 W08	344	100	1.0									
81	12	8	18062	N21 W22	346	200	1.0		N21 W29				R	10	1	AXX
81	12	9	18062	N22 W35	345	100	1.0									
81	12	11	18062					22855	N19 W62	345	X	4	M	120	2	DSO

HALE REGION 18053 CMP DATE 7.9 RETURN OF REGION 17997 ROTATION 2

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	1	18053	N03 E80	336	400	1.5		S01 E80				R	30	1	AXX
81	12	2	18053	N03 E67	336	600	1.0	22829	N02 E66	337	(AP)	4	M	20	1	AXX
81	12	3	18053	N04 E56	334	900	1.5	22829	N02 E52	337	(AP)	3				
81	12	4	18053					22829	N02 E39	337	AP	3				
81	12	5	18053					22829	N02 E25	337	(AP)	3	R	20	2	HSX
81	12	6	18053	N04 E17	333	700	2.0	22829	N02 E08	338	(AP)	2				
81	12	7	18053	N04 E03	333	600	2.5	22829	N02 W01	338	(AP)	3				
81	12	8	18053	N04 W10	334	600	2.5		N09 W01				B	380	15	EAI
81	12	9	18053	N04 W24	334	600	2.5	22852	N08 W32	342	(AP)	1	B	310	16	DAO
81	12	10	18053	N05 W37	334	700	2.5									
81	12	13	18053	N05 W76	334	400	2.0									

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HALE REGION 18054 CMP DATE 8.3 WESTERNMOST PORTION OF REGION 17989 ROTATION 3

				CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	1	18054	S18 E82	334	300	1.5										
81	12	2	18054	S20 E70	333	2500	2.0		22831	S19 E77	326	(B)	3	H	200	2	DSO
81	12	3	18054	S19 E59	331	2000	2.0		22831	S18 E60	329	(AP)	3				
81	12	4	18054						22831	S18 E47	329	(AP)	5				
81	12	5	18054						22831	S18 E33	329	(AP)	4	P	60	2	CSO
81	12	6	18054	S18 E22	328	1700	2.0		22831	S18 E19	327	(BP)	4				
81	12	7	18054	S19 E09	327	1800	2.0		22831	S18 E09	328	(BY)	5				
81	12	8	18054	S19 W04	328	1800	2.0		22849	S26 W03	326	(AP)	2				
81	12	8	18054	S19 W04	328	1800	2.0		22831	S18 W04	327	(AP)	5	H	100	2	CSO
81	12	9	18054	S19 W17	327	2300	2.5		22831	S17 W18	328	AP	4	H	230	1	HSX
81	12	10	18054	S19 W30	327	2500	2.5										
81	12	11	18054						22831	S18 W46	329	AP	4				
81	12	13	18054	S19 W68	326	1900	2.5		22831	S17 W72	328	(AP)	3				
81	12	14	18054	S20 W82	326	900	2.5			S18 W75				M	80	1	HRX

HALE REGION 18055 CMP DATE 8.6 RETURN OF REGION 17992 ROTATION 4

				CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	2	18055	N17 E78	325	3300	3.5		22832	N18 E78	325	(B)	3	H	130	4	DSO
81	12	3	18055	N17 E65	325	3800	3.0		22832	N19 E60	329	(B)	4				
81	12	4	18055						22832	N19 E53	323	(BY)	4				
81	12	5	18055						22832	N19 E40	322	(BY)	5	R	560	31	EKI
81	12	6	18055	N17 E26	324	3800	3.5		22832	N19 E23	323	(BY)	5				
81	12	7	18055	N17 E12	324	3700	3.5		22832	N19 E13	324	(B)	5				
81	12	8	18055	N18 W01	325	4400	4.0		22832	N19 W00	323	(B)	5	B	470	16	DKI
81	12	9	18055	N18 W14	324	4300	4.0		22832	N19 W14	324	(D)	5	B	890	27	EKI
81	12	10	18055	N18 W27	324	4400	4.0										
81	12	11	18055						22832	N19 W40	323	B	5				
81	12	13	18055	N19 W65	323	4000	4.0		22832	N19 W67	323	(B)	4				
81	12	14	18055	N19 W78	322	2000	4.0		22832	N18 W79	323	(B)	3	H	160	10	FAO

HALE REGION 18056 CMP DATE 8.7

				CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	2	18056	S33 E78	325	500	2.5		22830	S32 E76	327	AP	2	H		1	AXX
81	12	3	18056	S33 E65	325	700	2.0		22830	S32 E63	326	(AP)	2				
81	12	4	18056						22830	S31 E50	326	(AP)	2				
81	12	5	18056						22830	S31 E35	327	AP	1	R	70	1	HSX
81	12	6	18056	S33 E27	323	400	2.5		22830	S32 E22	324	(B)	2				
81	12	7	18056	S33 E14	322	400	2.0										
81	12	8	18056	S33 E01	323	400	2.5		22850	S32 W00	323	(B)	2				
81	12	9	18056	S33 W12	322	600	2.5		22850	S32 W12	322	B	4	H	80	5	DRO
81	12	10	18056	S33 W25	322	500	2.0										
81	12	11	18056						22856	S35 W35	318	X	2				
81	12	11	18056						22850	S30 W41	324	X	1				
81	12	13	18056	S34 W63	321	600	2.0										
81	12	14	18056	S34 W75	319	400	2.5										

HALE REGION 18058 CMP DATE 8.7

				CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	3	18058	N07 E68	322	600	3.0		22834	N08 E69	320	(B)	3				
81	12	4	18058						22834	N08 E56	320	(B)	4				
81	12	5	18058						22834	N08 E41	321	(B)	4	R	410	19	DAO
81	12	6	18058	N07 E28	322	3500	3.5		22834	N09 E24	322	(D)	5				
81	12	7	18058	N07 E14	322	3700	3.5		22834	N09 E14	323	(D)	3				
81	12	8	18058	N07 E01	323	3300	3.0		22834	N09 E01	322	(D)	5	H	740	47	FKI
81	12	9	18058	N08 W12	322	3800	3.5		22834	N09 W12	322	(D)	5	H	950	31	EKC
81	12	10	18058	N08 W26	323	3700	3.5										
81	12	11	18058						22834	N09 W40	323	BY	5				

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HALE REGION 18058 (CONT) CMP DATE 8.7

			CALCIUM PLAGE DATA						SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	13	18058	N08 W66	324	3300	3.5	22834	N09 W68	324	(BY)	3				
81	12	14	18058	N08 W78	322	2800	4.0	22834	N09 W73	317	(B)	3	H	20	6	CAO

HALE REGION 18063 CMP DATE 9.2 RETURN OF REGION 17991 ROTATION 7

			CALCIUM PLAGE DATA						SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	6	18063	S06 E35	315	100	1.5									
81	12	7	18063	S07 E21	315	100	1.0									
81	12	8	18063	S07 E08	316	100	1.0		S12 E13				B	60	1	HSX
81	12	9	18063	S07 W06	316	100	1.0									

HALE REGION 18059 CMP DATE 9.4 EASTERNMOST PORTION OF REGION 17989 ROTATION 3

			CALCIUM PLAGE DATA						SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	3	18059	S23 E76	314	800	2.5	22835	S19 E70	319	(AP)	4				
81	12	4	18059					22835	S20 E59	317	(BP)	4				
81	12	5	18059					22835	S20 E46	316	(BP)	4	R	300	20	CKO
81	12	6	18059	S22 E36	314	2500	3.0	22835	S20 E31	315	(BP)	4				
81	12	7	18059	S21 E22	314	2300	3.0	22835	S20 E21	316	(BP)	4				
81	12	8	18059	S20 E08	316	2700	2.5	22835	S19 E07	316	(BP)	4	H	150	6	CSO
81	12	9	18059	S20 W04	314	3300	2.5	22835	S20 W05	315	BP	4	H	160	5	CAO
81	12	10	18059	S21 W17	314	2800	2.5									
81	12	11	18059					22835	S19 W34	317	AP	4				
81	12	13	18059	S22 W57	315	2200	2.5	22835	S19 W60	316	(AP)	3				
81	12	14	18059	S23 W70	314	2500	3.0	22835	S18 W72	316	(AP)	3	B	90	1	HSX
81	12	15	18059	S25 W83	314	600	3.0									

HALE REGION 18061 CMP DATE 10.1 NEW, IN LOCATION OF REGION 18000

			CALCIUM PLAGE DATA						SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	3	18061	N14 E85	305	800	2.5	22837	N13 E81	308	AP	2				
81	12	4	18061					22837	N12 E70	306	(BP)	4				
81	12	5	18061					22837	N12 E55	307	(BP)	4	R	180	5	CSO
81	12	6	18061	N14 E46	304	2600	2.5	22837	N13 E40	306	(B)	5				
81	12	7	18061	N14 E31	305	2200	2.5	22837	N12 E30	307	(BP)	5				
81	12	8	18061	N13 E18	306	1700	2.0	22837	N12 E15	308	(BP)	5	H	170	15	CAO
81	12	9	18061	N13 E05	305	1000	2.0	22837	N12 E02	308	(BP)	5	H	170	1	HSX
81	12	10	18061	N13 W08	305	600	1.5									
81	12	11	18061					22837	N12 W25	308	AP	5				
81	12	13	18061	N13 W47	305	400	1.5	22837	N12 W50	306	(AP)	5	P	70	1	HAX
81	12	14	18061	N14 W60	304	300	1.0	22837	N12 W63	307	(AP)	4	H	150	1	HSX
81	12	15	18061					22837	N12 W78	309	(AP)	4	H	100	1	HSX

HALE REGION 18064 CMP DATE 10.1

			CALCIUM PLAGE DATA						SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	4	18064					22839	N06 E71	305	(B)	3				
81	12	5	18064					22839	N08 E62	300	(B)	4	R	180	6	EAO
81	12	6	18064	N07 E47	303	2800	3.0	22839	N06 E42	304	(B)	4				
81	12	7	18064	N07 E34	302	2100	3.0	22839	N07 E33	304	(B)	4				
81	12	8	18064	N07 E21	303	2200	3.5	22839	N06 E18	305	(BY)	5	H	100	23	CAO
81	12	9	18064	N07 E08	302	2000	2.5	22839	N07 E04	306	(BP)	4	H	140	18	CAO
81	12	10	18064	N08 W07	304	2000	2.5									
81	12	11	18064					22839	N07 W24	307	BP	4				
81	12	13	18064	N08 W46	304	1600	3.0	22839	N06 W51	307	(AP)	4				

CONT

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HALE REGION 18064 (CONT) CMP DATE 10.1

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	14	18064	N08 W59	303	1300	3.0	22839	N06 W63	307	(AP)	4	H	30	2	HSX
81	12	15	18064	N08 W72	303	1500	3.0	22839	N06 W78	309	(AP)	3	H		1	AXX

HALE REGION 18060 CMP DATE 10.2 RETURN OF REGION 18021 ROTATION 2

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	3	18060	S15 E85	305	500	1.5	22836	S14 E80	309	(AP)	2				
81	12	4	18060					22836	S15 E69	307	(AP)	3				
81	12	5	18060					22836	S14 E55	307	(AP)	4	R	180	2	HAX
81	12	6	18060	S15 E45	305	700	1.5	22836	S14 E39	307	(AP)	5				
81	12	7	18060	S16 E32	304	1100	2.0	22836	S15 E29	308	(AP)	5				
81	12	8	18060	S16 E20	304	1500	2.0	22836	S14 E15	308	(AP)	5	H	110	4	CSO
81	12	9	18060	S16 E07	303	1500	2.0	22836	S14 E02	308	(AP)	5	H	160	6	CSO
81	12	9	18060	S16 E07	303	1500	2.0	22854	S19 E07	303	(AP)	3	H	160	6	CSO
81	12	10	18060	S16 W06	303	1600	2.0									
81	12	11	18060					22836	S14 W25	308	AP	5				
81	12	13	18060	S17 W46	304	1500	2.0	22836	S14 W50	306	(AP)	5				
81	12	14	18060	S17 W59	303	1100	2.5	22836	S14 W62	306	(AP)	4	B	90	1	HSX
81	12	15	18060	S17 W72	303	1100	2.0	22836	S14 W77	308	(AP)	4	B	60	1	HSX

HALE REGION 18074 CMP DATE 11.3 NEW, FORMED IN NW PORTION OF 18004

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	9	18074	S08 E23	287	300	3.5	22853	S07 E24	286	(B)	4	H	60	9	CRO
81	12	10	18074	S08 E10	287	900	3.5									
81	12	11	18074					22853	S08 W03	286	B	4				
81	12	13	18074	S08 W30	288	2400	3.5	22853	S08 W31	287	(B)	5				
81	12	14	18074	S08 W44	288	2600	3.5	22853	S08 W43	287	(B)	5	H	400	22	EKO
81	12	15	18074	S08 W57	288	3300	3.5	22853	S08 W58	289	(B)	4	H	330	11	EKI
81	12	16	18074	S08 W71	289	3400	3.5	22853	S08 W71	288	(B)	4	H	350	8	EAO
81	12	17	18074	S08 W84	289	1400	3.5									

HALE REGION 18066 CMP DATE 11.5 NEW, FORMED IN MOST WEST PORTION 18005

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	5	18066					22842	N11 E80	282	AF	2	M	50	1	HSX
81	12	6	18066	N11 E67	283	1200	2.5	22842	N10 E62	284	(B)	3				
81	12	7	18066	N11 E54	282	1500	3.0	22842	N10 E52	285	(B)	4				
81	12	8	18066	N12 E38	286	1700	3.5	22842	N11 E38	285	(B)	4	H	230	17	DAO
81	12	9	18066	N12 E25	285	2000	3.5	22842	N11 E24	286	(B)	5	H	280	18	DAO
81	12	10	18066	N12 E11	286	1600	3.0									
81	12	11	18066					22842	N10 W03	286	B	4				
81	12	11	18066					22857	N17 E11	272	X	2				
81	12	13	18066	N12 W28	286	1600	2.5	22842	N11 W30	286	(B)	3				
81	12	14	18066	N12 W41	285	1100	2.5	22842	N11 W42	286	(B)	3	H	10	5	BXO
81	12	15	18066	N12 W55	286	1700	2.5		N17 W51				H	100	1	HSX
81	12	16	18066	N12 W69	287	2200	3.0		N17 W64				H	100	1	HSX
81	12	17	18066	N12 W83	288	700	2.5		N17 W81				M	90	1	HSX

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HALE REGION 18065 CMP DATE 11.8 RETURN OF PRECEDING POLARITY OF 18004 RORATION 3

			CALCIUM PLAGE DATA						SUNSPOT DATA								
YR	MO	DA	HL NO.	LAT	CMD	L	AREA	INT	MW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	6	18065	S14	E67	283	1000	1.5										
81	12	7	18065	S14	E54	282	1000	2.0	22847	S12	E56	281	(AP)	3				
81	12	8	18065	S13	E41	283	900	2.0	22847	S12	E42	281	(AP)	2	H	550	11	DKO
81	12	9	18065	S13	E28	282	700	2.0		S15	E38				H	810	15	DKC
81	12	10	18065	S13	E15	282	500	2.0										
81	12	13	18065	S13	W24	282	500	2.0										
81	12	14	18065	S13	W37	281	900	2.0		S08	W44				H	400	22	EKO
81	12	15	18065	S13	W50	281	1200	2.5		S16	W42				H	530	11	DHI
81	12	16	18065	S14	W64	282	800	2.5		S16	W56				H	540	8	DKO
81	12	17	18065	S13	W78	283	400	2.0		S15	W68				B	320	3	DSO

HALE REGION 18067 CMP DATE 12.1 RETURN OF REGION 18006 ROTATION 2

			CALCIUM PLAGE DATA						SUNSPOT DATA								
YR	MO	DA	HL NO.	LAT	CMD	L	AREA	INT	MW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	5	18067						22841	N18	E80	282	(AP)	3	R	130	1	HKX
81	12	6	18067	N18	E70	280	700	1.5	22841	N18	E65	281	(AP)	4				
81	12	7	18067	N17	E56	280	900	1.5	22841	N18	E55	282	(AP)	5				
81	12	8	18067	N17	E43	281	1200	1.5	22841	N18	E41	282	(AP)	5	H	80	81	HSX
81	12	9	18067	N17	E32	278	1000	1.5	22841	N18	E29	281	(AP)	5	H	100	1	HSX
81	12	10	18067	N17	E19	278	800	1.5										
81	12	11	18067						22841	N18	E02	281	AP	5				
81	12	13	18067	N17	W20	278	500	1.0	22841	N18	W24	280	(AP)	4				
81	12	14	18067	N17	W33	277	500	1.0	22841	N18	W37	281	(AP)	4	H	90	1	HSX
81	12	15	18067	N17	W46	277	500	1.0	22841	N18	W49	280	(AP)	4	H	100	1	HSX
81	12	16	18067	N17	W59	277	300	1.0	22841	N18	W64	281	(AP)	4	H	100	1	HSX
81	12	17	18067	N17	W72	277	200	1.0	22841	N18	W78	282	(AP)	3	B	30	1	HSX

HALE REGION 18071 CMP DATE 12.1 NEW, FORMED IN MOST EAST PORTION 18005

			CALCIUM PLAGE DATA						SUNSPOT DATA								
YR	MO	DA	HL NO.	LAT	CMD	L	AREA	INT	MW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	8	18071	N10	E47	277	500	2.5	22851	N10	E47	276	(B)	3	H	230	17	DAO
81	12	9	18071	N09	E34	276	600	2.0	22851	N09	E32	278	(B)	3	H	40	7	BXO
81	12	10	18071	N09	E20	277	400	1.5										
81	12	13	18071	N09	W20	278	200	1.0										
81	12	14	18071	N09	W33	277	100	1.0										
81	12	15	18071	N09	W46	277	100	1.0		N11	W47				L	10	3	BXO
81	12	16	18071	N09	W59	277	100	1.0										

HALE REGION 18068 CMP DATE 12.5 NEW, FORMED IN FOLLOWING POLARITY 18004

			CALCIUM PLAGE DATA						SUNSPOT DATA								
YR	MO	DA	HL NO.	LAT	CMD	L	AREA	INT	MW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	6	18068	S14	E77	273	1400	2.5	22845	S14	E72	274	(AP)	4				
81	12	7	18068	S14	E63	273	1200	2.5	22845	S15	E63	274	(AP)	4				
81	12	8	18068	S15	E50	274	2000	3.0	22845	S15	E50	273	(D)	5	H	550	11	DKO
81	12	9	18068	S15	E36	274	1800	3.5	22845	S15	E37	273	(BY)	5	H	810	15	DKC
81	12	10	18068	S15	E24	273	1800	3.5										
81	12	11	18068						22845	S16	E11	272	BY	5				
81	12	13	18068	S16	W15	273	2200	3.0	22845	S16	W16	272	(D)	5				
81	12	14	18068	S16	W28	272	2900	3.0	22845	S16	W28	272	(D)	5	H	630	11	DKI
81	12	15	18068	S16	W42	273	3000	3.5	22845	S16	W42	273	(AP)	5	H	530	11	DHI
81	12	16	18068	S17	W55	273	3000	3.5	22845	S16	W56	273	(AP)	5	H	540	8	DKO
81	12	17	18068	S17	W69	274	3000	3.5	22845	S16	W69	273	(AP)	4	B	320	3	DSO
81	12	18	18068	S16	W83	274	1000	2.5		S14	W85				H	270	1	HHX

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HALE REGION 18069 CMP DATE 13.4 RETURN OF REGION 18023 ROTATION 2

CALCIUM PLAGE DATA

YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT
81	12	6	18069				
81	12	7	18069	S18 E74	262	2000	2.5
81	12	8	18069	S19 E62	262	2700	2.5
81	12	9	18069	S20 E50	260	2000	2.5
81	12	10	18069	S20 E37	260	2000	2.5
81	12	11	18069				
81	12	13	18069	S20 W03	261	2000	2.5
81	12	13	18069	S20 W03	261	2000	2.5
81	12	14	18069	S20 W15	259	2000	2.5
81	12	15	18069	S21 W28	259	2000	3.0
81	12	16	18069	S21 W41	259	2000	3.0
81	12	17	18069	S20 W54	259	2500	2.5
81	12	18	18069	S20 W67	258	2000	2.5
81	12	19	18069	S18 W80	258	1700	2.5

SUNSPOT DATA

MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
			AP	1				
22846	S19 E82	264	(B)	3				
22846	S20 E72	265	(B)	3	H	60	2	CSO
22846	S20 E60	263	(BP)	4	H	110	3	CSO
22846	S20 E46	264						
			BP	4				
22846	S21 E18	265	(B)	4				
22846	S21 W07	263	(AF)	2				
22861	S23 E05	251	(AP)	4	H	20	1	HSX
22846	S20 W21	265	(B)	4	H	10	2	AXX
22846	S20 W34	265			P	10	2	AXX
	S18 W50							
	S15 W74				L	410	4	DHI

HALE REGION 18070 CMP DATE 13.7 RETURN OF REGION 18022 ROTATION 2

CALCIUM PLAGE DATA

YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT
81	12	7	18070	S07 E78	258	700	3.5
81	12	8	18070	S07 E67	257	2300	3.5
81	12	9	18070	S07 E54	256	2000	3.5
81	12	10	18070	S07 E40	257	2200	3.0
81	12	11	18070				
81	12	13	18070	S07 E01	257	2400	3.0
81	12	14	18070	S07 W13	257	2400	3.0
81	12	15	18070	S07 W26	257	2000	3.5
81	12	16	18070	S07 W39	257	2300	3.0
81	12	17	18070	S07 W53	258	2000	3.0
81	12	18	18070	S07 W67	258	2200	3.0
81	12	19	18070	S06 W80	258	2400	3.0

SUNSPOT DATA

MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
22848	S06 E80	257	(AP)	3				
22848	S07 E66	257	(B)	4	H	350	9	DKO
22848	S06 E54	256	(B)	5	H	480	13	DKO
22848	S08 E27	256	BP	5				
22848	S08 W01	257	(BP)	5				
22848	S08 W14	258	(BP)	5	H	230	12	CSO
22848	S08 W27	258	(AP)	5	H	230	4	CHO
22848	S08 W41	258	(AP)	5	H	170	1	HSX
22848	S08 W55	259	(AP)	4	B	130	1	HSX
	S07 W68				H	240	1	HSX
22848	S09 W83	261	(AP)	3	H	80	1	HHX

HALE REGION 18087 CMP DATE 14.9

CALCIUM PLAGE DATA

YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT
81	12	16	18087	S09 W23	241	200	2.5
81	12	17	18087	S08 W36	241	200	2.5
81	12	18	18087	S08 W50	241	300	2.5
81	12	19	18087	S08 W64	242	500	3.0
81	12	20	18087	S08 W77	242	300	2.5

SUNSPOT DATA

MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
22863	S09 W24	241	(AP)	3	P	20	3	BRO
22863	S08 W39	243	(AP)	4	B	20	2	CSO
	S08 W51				H	20	3	BXO
22863	S11 W67	245	(AF)	4	H	20	1	HRX
	S09 W71				M	30	1	HRX

HALE REGION 18072 CMP DATE 15.4

CALCIUM PLAGE DATA

YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT
81	12	9	18072	N08 E73	237	400	1.5
81	12	10	18072	N08 E62	235	400	1.5
81	12	13	18072	N08 E24	234	300	1.0
81	12	14	18072	N08 E09	235	300	1.0
81	12	15	18072	N08 W04	235	300	1.0
81	12	16	18072	N08 W17	235	300	1.0
81	12	17	18072	N09 W31	236	300	1.5
81	12	18	18072	N09 W44	235	300	1.5
81	12	19	18072	N10 W56	234	300	1.5
81	12	20	18072	N10 W69	234	200	1.0

SUNSPOT DATA

MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
	N07 W07				M	40	7	CRO
	N08 W34				L	10	3	BXO

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HALE REGION 18073 CMP DATE 15.8 RETURN OF REGION 18017 ROTATION 2

				CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	9	18073	S07 E75	235	800	1.5										
81	12	10	18073	S06 E68	229	800	1.5										
81	12	11	18073						22859	S12 E46	237	X	2				
81	12	13	18073	S07 E29	229	800	1.5										
81	12	14	18073	S07 E16	228	800	1.5			S06 E26				P	10	2	BXO
81	12	15	18073	S07 E02	229	800	1.5										
81	12	16	18073	S07 W10	228	800	1.5										
81	12	17	18073	S07 W23	228	800	1.0										
81	12	18	18073	S07 W37	228	500	1.0										
81	12	19	18073	S06 W50	228	500	1.0			S08 W58				L	20	1	HSX
81	12	20	18073	S07 W63	228	500	1.0			S09 W71				M	30	1	HRX

HALE REGION 18080 CMP DATE 16.4

				CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	16	18080	N07 W03	221	100	2.5		22864	N08 W04	221	(B)	3	H	10	4	BXO
81	12	17	18080	N07 W16	221	200	1.5		22864	N08 W16	220	(B)	2	R	20	4	BXO
81	12	18	18080	N07 W30	221	200	2.0			N08 W34				L	10	3	BXO
81	12	19	18080	N08 W44	222	100	1.0										
81	12	20	18080	N08 W57	222	100	1.0										

HALE REGION 18088 CMP DATE 17.2

				CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	19	18088	S15 W33	211	100	1.5			S11 W23				P	20	5	BXO

HALE REGION 18076 CMP DATE 17.3 RETURN OF REGION 18027 ROTATION 2

				CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	11	18076						22860	N13 E70	213	AP	2				
81	12	13	18076	N13 E48	210	2000	2.0		22860	N12 E45	211	(AP)	3				
81	12	14	18076	N13 E36	208	1600	2.0		22860	N12 E32	212	(AP)	2	P	10	2	AXX
81	12	15	18076	N13 E23	208	1600	2.0										
81	12	16	18076	N13 E08	210	1500	2.5										
81	12	17	18076	N14 W05	210	1000	2.5										
81	12	18	18076	N14 W20	211	1000	2.5										
81	12	19	18076	N15 W34	212	1200	2.5										
81	12	20	18076	N14 W46	211	1000	2.5			N14 W41				H	10	1	AXX
81	12	21	18076	N14 W62	212	800	2.5			N13 W53				H		1	AXX
81	12	22	18076	N14 W70	209	1100	2.0										

HALE REGION 18077 CMP DATE 18.1 NEW, NEAR LOCATION OF REGION 18027

				CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	13	18077	N13 E58	200	1400	2.5		22862	N10 E58	198	(B)	4				
81	12	14	18077	N13 E46	198	1400	2.5		22862	N11 E45	199	(BP)	4	H	30	7	CRO
81	12	15	18077	N12 E34	197	1000	2.5		22862	N11 E31	200	(BP)	4	H	50	3	CRO
81	12	16	18077	N12 E20	198	1100	2.5		22862	N11 E16	201	(BP)	4	H	40	4	CRO
81	12	17	18077	N12 E06	199	1000	2.5		22862	N13 E03	201	(BP)	4	B	30	4	HSX
81	12	18	18077	N12 W07	198	1000	2.5			N13 W11				H	40	3	DAO
81	12	19	18077	N12 W21	199	1400	2.5		22862	N12 W24	202	(B)	3	H	20	2	BXO
81	12	20	18077	N12 W34	199	1300	2.0		22862	N14 W39	204	(AF)	3	H	10	1	AXX
81	12	21	18077	N12 W49	199	1200	2.5		22862	N14 W53	205	(AF)	3	H		1	AXX
81	12	22	18077	N11 W59	198	800	2.5			N13 W57				M	10	1	AXX
81	12	23	18077	N10 W71	197	300	2.0										

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HALE REGION 18082 CMP DATE 19.1

				CALCIUM PLAGE DATA						SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	17	18082	S09 E23	182	200	3.0	22865	S09 E21	183	(B)	3	B	30	4	CSO
81	12	18	18082	S09 E08	183	900	3.5		S08 E08				H	100	8	DRO
81	12	19	18082	S09 W07	185	1000	3.0	22865	S09 W05	183	(B)	4	H	70	12	CSO
81	12	20	18082	S09 W20	185	900	2.5	22865	S09 W19	184	(B)	4	H	20	8	CRO
81	12	21	18082	S09 W34	184	800	2.5	22865	S09 W34	186	(B)	4	H	20	6	CSO
81	12	22	18082	S10 W45	184	1200	3.0	22865	S09 W41	180	(AP)	3	H	10	3	BXO
81	12	23	18082	S10 W58	184	1100	3.0		S09 W62				H		1	AXX

HALE REGION 18094 CMP DATE 19.3

				CALCIUM PLAGE DATA						SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	22	18094	S20 W44	183	100	2.5									

HALE REGION 18084 CMP DATE 19.7

				CALCIUM PLAGE DATA						SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	18	18084	N47 E14	177	100	1.0									

HALE REGION 18079 CMP DATE 20.9 RETURN OF REGION 18031 ROTATION 6

				CALCIUM PLAGE DATA						SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	15	18079	S13 E75	156	300	1.0									
81	12	16	18079	S12 E53	165	400	1.5									
81	12	17	18079	S13 E42	163	800	1.0									
81	12	18	18079	S13 E29	162	600	1.0									
81	12	19	18079	S13 E16	162	500	1.0									
81	12	20	18079	S13 E03	162	600	1.0									
81	12	21	18079	S13 W11	161	500	1.0									
81	12	22	18079	S13 W22	161	500	1.0									
81	12	23	18079	S13 W34	160	600	1.0		S16 W37				H	20	3	BXO

HALE REGION 18095 CMP DATE 20.9

				CALCIUM PLAGE DATA						SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	23	18095	S18 W36	162	300	2.0	22874	S18 W37	162	(B)	3	H	20	3	BXO
81	12	24	18095					22874	S17 E50	62	(AP)	3	H	10	1	AXX

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HALE REGION 18083 CMP DATE 21.4 RETURN OF REGION 18032 ROTATION 3

CALCIUM PLAGE DATA								SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	17	18083	N16 E52	153	200	1.0									
81	12	18	18083	N16 E36	155	200	1.0		N16 E35				H	10	1	AXX
81	12	19	18083	N15 E23	155	100	1.0		N17 E30				L		1	AXX
81	12	20	18083	N15 E10	155	100	1.0									

HALE REGION 18078 CMP DATE 21.6

CALCIUM PLAGE DATA								SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	15	18078	S23 E78	153	300	1.0									
81	12	16	18078	S22 E64	154	200	1.5		S21 E72				M	20	2	BXO
81	12	17	18078	S23 E49	156	300	2.0									
81	12	18	18078	S23 E35	156	200	1.5									
81	12	19	18078	S23 E22	156	200	1.0									
81	12	20	18078	S23 E10	155	200	1.0									
81	12	21	18078	S24 W04	154	300	1.5									
81	12	22	18078	S24 W15	154	200	1.0									
81	12	23	18078	S23 W28	154	200	1.0									

HALE REGION 18108 CMP DATE 23.2

CALCIUM PLAGE DATA								SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	28	18108	S26 W73	132	300	2.5	22884	S26 W70	129	(AP)	2				
81	12	29	18108	S27 W85	131	300	3.0									

HALE REGION 18085 CMP DATE 24.0

CALCIUM PLAGE DATA								SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	18	18085	N08 E74	117	900	3.0		N13 E77				H	180	2	CAO
81	12	19	18085	N09 E58	120	900	2.5	22867	N11 E55	123	(AP)	3	H	10	2	BXO
81	12	20	18085	N09 E45	120	600	2.5	22867	N10 E39	126	(AP)	3	H		1	AXX
81	12	21	18085	N09 E28	122	300	2.5	22867	N10 E26	126	(AP)	3	H		2	AXX
81	12	22	18085	N09 E18	121	400	2.0	22867	N10 E15	124	(B)	3	H	10	3	BXO
81	12	23	18085	N10 E05	121	400	2.0		N11 E02				H	10	2	AXX
81	12	25	18085						N12 W15				H	190	4	CHO
81	12	26	18085	N10 W38	123	400	2.0		N12 W29				H	180	5	CSO
81	12	27	18085	N10 W53	124	400	2.0		N13 W44				P	170	2	CSO
81	12	28	18085	N12 W66	125	300	1.0		N12 W58				H	100	1	HSX

HALE REGION 18086 CMP DATE 25.0 RETURN OF REGION 18035 ROTATION 4

CALCIUM PLAGE DATA								SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	18	18086	N13 E79	112	3000	3.5		N13 E77				H	180	2	CAO
81	12	19	18086	N13 E67	111	3000	3.0	22868	N13 E65	113	(AP)	4	H	220	1	HHX
81	12	20	18086	N13 E56	109	3200	3.0	22868	N12 E51	114	(AP)	5	H	190	1	HSX
81	12	21	18086	N14 E40	110	3200	3.0	22868	N12 E37	115	(AP)	5	H	240	1	HSX
81	12	22	18086	N14 E30	109	3500	3.0	22868	N12 E24	115	(BP)	5	H	230	3	DAO
81	12	23	18086	N14 E18	108	3500	2.5	22868	N11 E09	116	(BY)	5	H	210	4	CHO
81	12	24	18086					22868	N10 W02	114	(AP)	5	H	200	1	HHX
81	12	25	18086						N12 W15				H	190	4	CHO
81	12	26	18086	N14 W22	107	2800	2.5	22868	N11 W29	114	(BP)	5	H	180	5	CSO
81	12	27	18086	N14 W36	107	2700	2.5	22868	N11 W42	115	(AP)	4	P	170	2	CSO
81	12	28	18086	N14 W49	108	3000	2.5	22868	N11 W55	114	(AP)	5	H	100	1	HSX
81	12	29	18086	N14 W62	108	2500	2.5	22868	N11 W68	114	(AP)	4	H	100	1	HSX
81	12	30	18086	N14 W75	107	1700	2.5									

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HALE REGION 18092 CMP DATE 25.2 NEW, IN LOCATION OF REGION 18042

				CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	21	18092	S25 E44	106	300	2.0		S24 E47				H		1	AXX
81	12	22	18092	S25 E34	105	700	3.0		S24 E35				R	60	12	CRO
81	12	23	18092	S24 E20	106	1300	3.0		S23 E11				H	70	10	CAO
81	12	25	18092						S25 W03				H	10	2	AXX
81	12	26	18092	S24 W20	105	900	2.5		S23 W17				B	30	4	CRO
81	12	27	18092	S24 W33	104	600	2.5		S22 W26				P	230	10	DAO
81	12	28	18092	S24 W46	105	500	2.5		S21 W40				H	210	12	DAO
81	12	29	18092	S25 W58	104	300	2.5		S22 W50				H	170	8	DSO
81	12	30	18092	S25 W72	104	200	1.5		S22 W65				R	250	8	CAO

HALE REGION 18081 CMP DATE 25.6

				CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	16	18081	S11 E20	198	100	2.0									
81	12	17	18081	S11 E06	199	100	1.0									
81	12	18	18081	S12 W08	199	200	1.5		S11 W09				H		1	AXX
81	12	19	18081	S12 W22	200	600	3.5	22866	S12 W21	199	(B)	3	H	30	7	BXO
81	12	20	18081	S12 W35	200	700	3.0	22866	S12 W34	199	(B)	3	H	20	6	BXO
81	12	21	18081	S12 W50	200	700	3.0	22866	S12 W50	202	(AP)	3	H	10	3	AXX
81	12	22	18081	S13 W61	200	700	2.5	22866	S12 W62	201	(AP)	3	H		1	AXX
81	12	23	18081	S13 W74	200	400	2.5									

HALE REGION 18097 CMP DATE 25.7

				CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	21	18097					22869	S23 E46	106	(AP)	3	H		1	AXX
81	12	22	18097					22869	S23 E33	106	(B)	3	R	60	12	CRO
81	12	23	18097					22869	S23 E20	105	(B)	3	H	70	10	CAO
81	12	24	18097					22869	S23 E09	103	(B)	3	H	60	6	CSO
81	12	25	18097						S25 E05				M	30	2	DRO
81	12	26	18097	S22 W13	98	300	2.5	22875	S17 W17	102	(AP)	2	R	10	3	BXO
81	12	26	18097	S22 W13	98	300	2.5	22869	S22 W13	98	(BY)	3	B	30	4	CRO
81	12	27	18097	S22 W26	97	800	3.5	22869	S22 W26	99	(B)	4	P	230	10	DAO
81	12	28	18097	S22 W39	98	1200	3.0	22869	S22 W38	97	(B)	5	H	210	12	DAO
81	12	29	18097	S22 W52	98	1300	3.0	22869	S22 W51	97	(B)	5	H	170	8	DSO
81	12	30	18097	S21 W65	97	1300	3.5		S22 W65				R	250	8	CAO
81	12	31	18097	S21 W78	97	1300	3.5	22869	S22 W79	99	(AP)	3	H		1	AXX

HALE REGION 18098 CMP DATE 26.4

				CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	25	18098						S25 E05				M	30	2	DRO
81	12	26	18098	S23 W04	89	300	1.5		S21 W11				R	10	3	BXO
81	12	27	18098	S23 W18	89	300	1.5		S22 W18				P	30	4	BXO

HALE REGION 18089 CMP DATE 27.1 RETURN OF REGION 18044 ROTATION 2

				CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	20	18089	N09 E78	87	300	2.0									
81	12	21	18089	N10 E64	86	600	1.5									
81	12	22	18089	N13 E55	84	2500	2.0									
81	12	23	18089	N14 E43	83	2500	2.0									
81	12	26	18089	N14 E05	80	1400	2.0	22876	N16 W04	89	(AP)	2				
81	12	27	18089	N14 W09	80	1500	2.0									
81	12	28	18089	N14 W21	80	1300	2.0		N15 W22				H		1	AXX

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HALE REGION 18089 (CONT) CMP DATE 27.1 RETURN OF REGION 18044 ROTATION 2

			CALCIUM PLAGE DATA						SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	29	18089	N14 W33	79	1400	2.0		N19 W39				H	30	8	BXO
81	12	30	18089	N14 W47	79	1300	1.5									
81	12	31	18089	N14 W61	80	1300	1.5		N19 W70				P	250	5	CKI

HALE REGION 18090 CMP DATE 27.1

			CALCIUM PLAGE DATA						SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	20	18090	N20 E85	80	200	2.5									
81	12	21	18090	N21 E68	82	600	2.0	22871	N24 E83	69	AP	2	R	10	2	BXO
81	12	22	18090	N22 E58	81	2000	3.0	22871	N24 E60	79	(AP)	3	H	10	3	AXX
81	12	23	18090	N22 E45	81	2100	3.0	22871	N24 E43	82	(B)	3	H	100	15	CRI
81	12	24	18090					22871	N24 E30	82	(B)	3	H	180	23	DAI
81	12	25	18090						N22 E16				H	180	14	DAO
81	12	26	18090	N23 E05	80	2700	3.0	22871	N22 E03	82	(B)	4	H	130	14	DAO
81	12	27	18090	N23 W10	81	2700	3.5	22871	N21 W10	83	(B)	2	P	120	18	DAO
81	12	28	18090	N23 W24	83	3000	3.0	22871	N20 W23	82	(B)	3	H	40	17	BXO
81	12	29	18090	N22 W36	82	2700	3.0	22871	N19 W40	86	(BP)	4	H	30	8	BXO
81	12	30	18090	N20 W50	82	2700	3.0		N20 W54				R	40	4	BXO
81	12	31	18090	N21 W64	83	3000	3.0	22871	N19 W69	89	(D)	4	H	80	5	CSO

HALE REGION 18109 CMP DATE 27.2

			CALCIUM PLAGE DATA						SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	28	18109	S19 W20	79	200	2.5	22885	S19 W19	78	(B)	2	H	10	5	BXO
81	12	29	18109	S19 W33	79	300	2.5	22885	S18 W31	77	(BY)	3	H	10	5	BXO
81	12	30	18109	S19 W46	78	600	3.0		S18 W45				R	60	7	CAO
81	12	31	18109	S18 W59	78	400	2.5	22885	S19 W59	79	(B)	3	H	10	5	BXO

HALE REGION 18091 CMP DATE 27.6

			CALCIUM PLAGE DATA						SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	20	18091	S23 E85	80	400	3.0		S22 E85				H	190	1	HHX
81	12	21	18091	S24 E73	77	2000	3.5	22870	S22 E74	78	(AP)	4	H	190	1	HHX
81	12	22	18091	S24 E64	75	2800	3.0	22870	S22 E60	79	(BP)	4	H	350	7	DHO
81	12	23	18091	S25 E50	76	2200	3.0	22870	S22 E49	76	(BP)	5	H	250	3	CHO
81	12	24	18091					22870	S22 E35	77	(AP)	5	H	190	1	HHX
81	12	25	18091						S23 E21				H	180	1	HHX
81	12	26	18091	S25 E10	75	1800	3.0	22870	S23 E09	76	(BP)	5	H	220	4	CSO
81	12	27	18091	S25 W03	74	1800	3.5	22870	S24 W03	76	(BP)	5	P	270	8	DSO
81	12	28	18091	S25 W16	75	1800	3.0	22870	S25 W17	76	(D)	5	H	290	8	DHI
81	12	29	18091	S26 W30	76	1800	3.0	22870	S25 W30	76	(B)	5	H	260	14	CHI
81	12	30	18091	S26 W43	75	2000	3.0		S23 W44				R	330	6	CKO
81	12	31	18091	S26 W56	75	2000	3.0	22870	S25 W57	77	(BP)	4	H	230	3	HAX
82	01	2	18091					22870	S25 W83	76	AP	2	R	190	2	C O

HALE REGION 18093 CMP DATE 28.2 RETURN OF REGION 18039 ROTATION 3

			CALCIUM PLAGE DATA						SUNSPOT DATA							
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	21	18093	S14 E74	76	2000	1.5									
81	12	22	18093	S14 E65	74	5000	2.0	22872	S08 E69	70	(AP)	2	H	30	1	HSX
81	12	23	18093	S14 E59	67	5500	2.0	22873	S09 E62	63	(AP)	3	H	10	3	AXX
81	12	23	18093	S14 E59	67	5500	2.0	22872	S08 E57	68	(AP)	3	H	10	3	AXX
81	12	24	18093					22873	S08 E42	70	(AP)	3	H	10	2	AXX
81	12	26	18093	S14 E20	65	7000	2.5	22873	S08 E17	68	(AP)	3	H	10	1	BXO
81	12	26	18093	S14 E20	65	7000	2.5	22877	S11 E10	75	X	1	H	10	1	BXO

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HALE REGION 18093 (CONT) CMP DATE 28.2 RETURN OF REGION 18039 ROTATION 3

CALCIUM PLAGE DATA

YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT
81	12	27	18093	S14 E05	66	7000	2.5
81	12	27	18093	S14 E05	66	7000	2.5
81	12	28	18093	S14 W09	68	6600	2.5
81	12	29	18093	S15 W20	66	6800	2.5
81	12	29	18093	S15 W20	66	6800	2.5
81	12	30	18093	S15 W32	64	7200	2.5
81	12	31	18093	S14 W45	64	7500	2.5
82	01	3	18093	S14 W85	65	1000	1.0

SUNSPOT DATA

MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
22877	S13 W00	73	(AP)	3				
22883	S14 W07	80	(AP)	3				
22886	S11 E03	56	(AF)	3	B		2	AXX
22891	S09 W22	68	(AP)	3	H	10	4	BXO
22886	S11 W10	56	(AF)	3	H	10	3	AXX
	S20 W30				R	20	5	BXO
	S09 W42				L	10	2	AXX

HALE REGION 18096 CMP DATE 28.4

CALCIUM PLAGE DATA

YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT
81	12	23	18096	N16 E70	56	500	2.0
81	12	25	18096				
81	12	26	18096	N17 E23	62	200	1.0
81	12	27	18096	N17 E08	63	100	1.0

SUNSPOT DATA

MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
	N22 E26				L	190	25	DAO
22878	N07 E17	68	(B)	2	R	10	3	BXO

HALE REGION 18099 CMP DATE 28.4 RETURN OF REGION 18046 ROTATION 2

CALCIUM PLAGE DATA

YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT
81	12	25	18099				
81	12	26	18099	S20 E23	62	800	3.0
81	12	27	18099	S20 E09	62	800	2.5
81	12	28	18099	S23 W04	63	700	3.0
81	12	29	18099	S23 W17	63	700	2.5
81	12	29	18099	S23 W17	63	700	2.5
81	12	30	18099	S22 W30	62	700	3.0
81	12	31	18099	S22 W44	63	600	3.0

SUNSPOT DATA

MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
	S23 E29				H	190	2	CHO
22879	S20 E22	63	(BY)	3	H	30	10	CRO
22880	S20 E10	63	(BY)	3	P	40	10	CAO
22880	S20 W05	64	(B)	5	H	20	8	BXO
22880	S21 W18	64	(B)	4	H	20	7	BXO
22892	S15 W10	56	(AF)	3	H	10	3	AXX
	S20 W30				R	20	5	BXO
22880	S21 W42	62	(AF)	2	L	30	7	BXO

HALE REGION 18100 CMP DATE 29.3 RETURN OF REGION 18040 ROTATION 3

CALCIUM PLAGE DATA

YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT
81	12	26	18100	N17 E35	50	300	2.0
81	12	27	18100	N17 E21	50	300	2.0
81	12	28	18100	N17 E08	51	200	2.0
81	12	29	18100	N17 W05	51	200	1.5
81	12	30	18100	N17 W18	50	200	1.0
81	12	31	18100	N17 W32	51	100	1.0

SUNSPOT DATA

MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS

HALE REGION 18101 CMP DATE 29.9

CALCIUM PLAGE DATA

YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT
81	12	26	18101	N15 E42	43	200	2.5
81	12	27	18101	N15 E28	43	100	1.0

SUNSPOT DATA

MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS

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HALE REGION 18114 CMP DATE 29.9

			CALCIUM PLAGE DATA						SUNSPOT DATA								
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	30	18114	N19 W11	43	100	2.0									

HALE REGION 18102 CMP DATE 30.5 RETURN OF REGION 18047 ROTATION 2

			CALCIUM PLAGE DATA						SUNSPOT DATA								
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	25	18102						S09 E58				H		1	AXX
81	12	26	18102	S13 E49	36	3700	3.0		S15 E50				H		1	AXX
81	12	27	18102	S12 E34	37	2800	2.5		S09 E39				P	10	3	AXX
81	12	28	18102	S13 E22	37	2900	2.5	22887	S12 E20	39	(BY)	3	H	10	7	BXO
81	12	29	18102	S13 E10	36	2600	2.5	22893	S10 W01	47	(AP)	2	H	10	3	AXX
81	12	30	18102	S14 W03	35	3000	2.5									
81	12	31	18102	S14 W16	35	2700	2.5	22897	S10 W21	41	(AP)	2				
82	01	1	18102						S10 W23				M	20	6	BXO
82	01	3	18102	S15 W56	36	3000	2.0									
82	01	4	18102	S14 W70	36	2500	2.0									

HALE REGION 18105 CMP DATE 30.5

			CALCIUM PLAGE DATA						SUNSPOT DATA								
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	27	18105	N19 E38	33	500	3.5		N18 E38				P	10	3	AXX
81	12	28	18105	N19 E25	34	1700	3.5	22888	N18 E25	34	(B)	5	H	160	14	DSO
81	12	29	18105	N18 E12	34	2000	3.0	22888	N18 E12	34	(B)	5	H	240	21	DSI
81	12	30	18105	N18 W03	35	1700	3.5		N18 W01				R	220	14	DKO
81	12	31	18105	N18 W15	34	1500	3.5	22888	N18 W13	33	(B)	5	H	220	5	DSO
82	01	1	18105						N22 W28				B	130	3	DAO
82	01	2	18105					22888	N18 W40	33	B	4	R	100	7	DAO
82	01	3	18105	N18 W54	34	1300	2.5	22888	N18 W55	35	B	4	H	40	6	CRO
82	01	4	18105	N19 W66	32	1400	2.5		N18 W68				H	10	2	BXO
82	01	5	18105						N18 W75				L		1	AXX

HALE REGION 18103 CMP DATE 31.5

			CALCIUM PLAGE DATA						SUNSPOT DATA								
YR	MO	DA	HL NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
81	12	25	18103						S11 E71				L		1	AXX
81	12	26	18103	S12 E65	20	600	3.0	22881	S10 E67	18	(B)	3	H	10	5	CRO
81	12	27	18103	S11 E51	20	900	3.5	22881	S11 E50	23	(B)	3	P	30	6	CAO
81	12	28	18103	S12 E38	21	900	3.0	22881	S12 E38	21	(B)	3	H	20	7	CRO
81	12	29	18103	S12 E25	21	900	2.5	22881	S12 E23	23	(BP)	3	H	10	5	BXO
81	12	30	18103	S12 E10	22	800	2.5		S12 E09				R	10	3	BXO
81	12	31	18103	S12 W03	22	800	2.5	22898	S10 W06	26	(B)	4	H	10	2	BXO
82	01	1	18103						S09 W17				R	10	3	BXO
82	01	3	18103	S12 W44	24	400	2.5									

NOTE: No solar magnetograms were made at Kitt Peak National Observatory on December 4, 5, 11, 12, 24 and 25, 1981.
On these dates calcium spectroheliograms from Sacramento Peak Observatory were used: December 15-23 and 26-31, 1981.
On these dates calcium spectroheliograms from Mt. Wilson Observatory were used: December 2, 3, 6-8, and 14, 1981.
No Mt. Wilson sunspot data were available for December 1, 10, 12, 18, 25, and 30, 1981.

CONTIGUOUS PLAGES FOR DECEMBER 1981: 18053/18058, 18061/18064, 18076/18077, 18093/18099

DAILY CALCIUM PLAGE INDEX

DECEMBER 1981

YR	MO	DAY	INDEX	YR	MO	DAY	INDEX	YR	MO	DAY	INDEX
81	12	1	61.3	81	12	11	*	81	12	21	17.7
81	12	2	65.7	81	12	12	*	81	12	22	29.3
81	12	3	64.7	81	12	13	56.4	81	12	23	32.2
81	12	4	*	81	12	14	44.5	81	12	24	*
81	12	5	*	81	12	15	37.4	81	12	25	*
81	12	6	73.0	81	12	16	30.5	81	12	26	51.7
81	12	7	71.2	81	12	17	19.1	81	12	27	57.2
81	12	8	82.1	81	12	18	17.1	81	12	28	65.1
81	12	9	89.0	81	12	19	18.4	81	12	29	65.4
81	12	10	81.5	81	12	20	15.1	81	12	30	67.0
								81	12	31	60.4

* NO OBSERVATIONS

SUDDEN IONOSPHERIC DISTURBANCES

DECEMBER 1981

DAY	UNIVERSAL TIME START	END	MAX	IMP	WIDE SPREAD INDEX	NUMBER OF STATION REPORTS BY TYPE SWF	SCNA	SEA	SPA	LF-SPA	SES	SFD	KNOWN FLARE	HALE REGION
01	0102	0256	0108	2+	5	2			2		4		0102E	18044
01	0313	0516	0416	1-	3	1			1	1			0310	18044
01	0540	0750	0558	2	3				2				NF	
01	0546	0636D	0555	1-	3					1	3		0545	18044
01	0754	0820	0803	1	3						3		0754	18044
01	0825	1015	0845	2+	5	3			1	1	2		0824	18044
01	1215	1315	1220	1-	3				2	1			1214	18044
01	1355	1440	1412	1-	1				1		1		NF	
01	1509	1545	1515	1-	3				1		2		1511E	18046
01	1539	1630	1549	1-	1				1		1		1539	18051
01	1655	1745	1706	1+	5				1		13		1654	18044
01	1705	1830	1713	1-	3				1		5		1703	18051
02	0340	0508	0356	1+	5	1			2		4		0341	18046
02	1707	1728	1715	1-	3				1		5		NF	
02	1802	1815	1807	1-	3						3		NF	
02	2031	2100	2042	1	3						8		2031	18044
03	0350	0400U	0352	1-	1					1			0349	18044
03	0556	0724	0606	1-	3				2	1			0556	18035
03	1603	1632	1609	1-	1				1		1		1601E	18044
03	1731	1800	1745	1	3						14		*	
04	0227	0334	0250U	1-	1	1							0228	No data
04	0304	0434	0321	1	3	2			2	1	2		0304	No data
04	1415	1500	1430	2+	3						3		NF	
04	1727	1800	1731	1+	3						14		*	
05	0023	0110	0036	1-	3	1			1		1		NF	
05	1140	1145	1143	1-	3	1				1			1137	No data
05	1540	1700	1555	1-	3				1		3		*	
05	1928	2010	1938	1-	3						2		*	
06	0114	0143	0119	1-	3	1			1				0109E	18066
06	0247	0311	0254	1-	1				1				*	
06	1710	1750	1720	1-	3				1		11		NF	
06	1856	2000	1906	1-	5				1		17		*	
06	1959	2030	2002	1-	3						7		*	
06	2127	2254	2133	1-	3				1		6		*	
06	2256	0018	2321	1-	1				1				*	
07	0059	0139U	0107	1-	3	1			1	1			NF	
07	0149	0215	0159	1-	3	1				1			0147	18055
07	0243	0326	0254	1-	3	1			1	1			0246E	18070
07	0334	0434	0339	1+	3	1			1	1			*	
07	0440	0642	0455	2+	3				1	1			NF	
07	0628	0700	0640	3	1			1		1			NF	
07	1233	1250	1238	1-	3			3		1			NF	
07	1330	1435	1336	1	3	1		2	1	1			*	
07	1444	1610	1457	1+	5				1		11		NF	
07	1511	1530	1515	1-	3						5		NF	
07	1637	1705	1643	1-	3						6		1631	18054
07	1902	1930	1908	1-	3						13		1902	18047
07	2024	2050	2031	1-	3						5		NF	
08	0034	0124	0041	1-	3	1			1	1			0037	18069
08	0141	0224	0153	1-	3	1			1	1			*	
08	0306	0416	0323	1-	3				1	1			0306E	18061
08	0419	0523	0425	1-	3				1	1			0418	18070
08	1115	1155	1125	1	3				1	1			*	
08	1236	1300	1240	1+	3			2	1	1			1239	18070
08	1425	1505	1441	1-	3				1		2		*	
08	1520	1620	1529	1-	3				1		3		NF	
08	1713	1732	1721	1	3				1		7		NF	
08	1756	1828	1806	1-	3				1		9		NF	
08	1827	1925	1840	1-	3				1		12		1829	18058
08	2232	2320	2244	1-	5				1		6		NF	
09	0132	0306	0150	1	5	1			2	1	3		0136	18055
09	0328	0509D	0351	2+	5	2			2	1	1		0327	18055
09	0508E	0556	0516	1	3				1		1		NF	
09	0638	0822	0650	1	3				2	1	5		0638	18068
09	0733	0846	0737	1	1				1				0735	18055

SUDDEN IONOSPHERIC DISTURBANCES

DECEMBER 1981

DAY	UNIVERSAL TIME START	END	MAX	IMP	WIDE SPREAD INDEX	NUMBER OF STATION REPORTS BY TYPE SWF	SCNA	SEA	SPA	LF-SPA	SES	SFD	KNOWN FLARE	HALE REGION
09	1459	1542	1507	1	3				1	9			1509E	18054
09	1705	1740	1716	1+	3						12		1701	18052
09	1840	1857	1845	1-	3				1		17		1838	18068
09	1858	025	1915	1	3				1		14		1855	18061
10	0629	0735	0639	1-	3				1	1	3		NF	
10	1530	1600	1535	1-	3						7		1532	18055
10	1630	1700	1640	1-	3						5		1630	18055
10	1709	1730	1712	1-	3						8		1707	18058
10	1813	1859	1818	2	3						12		1805	18055
10	2146	2312	2158	1-	3				1		7		2148E	18055
11	0109	0127	0112	1+	1	1							0107	18055
11	0227	0248	0231	1-	3				1	1			0226	No data
11	0304	0348	0316	1-	3				2	1			0304	No data
11	0440	0523	0446	1-	3				2	1	3		0440	No data
11	0746	0800	0751	1-	3	1			1	1	2		0747	No data
11	2015	2040	2019	1-	3						6		*	
11	2325	0004	2333	1-	1				1				2326E	No data
12	0144	0215	0147	1-	3	1			2	1	1		0144	No data
12	0308	0420	0334	1+	5				2	1	4		*	
12	0324	0435U	0333	1	3	2					1		0321	No data
12	0422E	0547	0426	1	3				1		1		0421	No data
12	1643	1902	1700	1	5				1		14		*	
13	1056	1140	1101	1+	3	1		2		1	1		*	
13	1903	1955	1910	1	5				1		14		1913E	18074
13	2130	2148	2138	1+	5	1			1		7		2129	18055
14	0333	0403U	0336	1-	1					1			0331	18074
15	0046	0144	0055	1-	1					1			NF	
15	0735	0808	0740	1-	1					1			0735	18074
15	0850	0906	0855	1-	1						1		0846	18070
15	1947	2130	1957	1	5	1			1		10		1945	18061
15	2332	0015D	2338	1-	3				1		1		2333	18074
16	0407E	0524	0407	1-	1				1				0401	18070
16	1618	1750	1627	1	5	1			1		14		NF	
17	0804	0927	0818	1	3				1		2		NF	
17	1450	1502	1454	1-	1				1				*	
19	0744	0830	0757	2	3						2		NF	
21	1822	1845	1824	1-	1						1		NF	
21	2115	2145	2119	1-	1						1		*	
24	1839	1850	1842	1-	3						7		1834	No data
25	0250	0309	0254	1-	1				1				NF	
25	1730	1805	1745	1-	3				1		3		*	
26	0141	0315	0155	1-	3				2				*	
26	0501	0613	0518	1-	3				1	1			NF	
27	0205	0235D	0210	1-	3				1	1			NF	
27	0250	0350D	0308	1-	1					1			0256	18099
27	0913	1012	0923	1-	3				1		1		0909	18099
27	1655	1712	1701	1-	1				1				*	
28	0312	0341	0318	1-	3				1	1			NF	
28	1020	1100	1036	1-	3				1		1		1025	18111
28	1801	1830	1813	1+	3						8		NF	
28	1828	1900	1843	1-	3						5		1828E	18105
30	0218	0318	0248	1-	1				1				*	
30	2219	2309	2232	1-	1				1				2217E	18106
30	2358	0022	0004	1-	1				1				2353	18102
31	0157	0225	0202	1-	3				1	1			*	
31	1923	2000	1931	1	3						6		*	
31	2357	0100	0001	1	1								*	

SUDDEN IONOSPHERIC DISTURBANCES

DECEMBER 1981

DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
REGION																															
18035			1	1																											
18044	7	1	2	2																											
18046	1	1																													
18047							1																								
18051	2																														
18052									1																						
18054							1		1																						
18055							1		3	4	1		1																		
18058								1		1																					
18061								1	1						1																
18066						1																									
18068									2																						
18069								1																							
18070							1	2							1	1															
18074													1	1	2																
18099																											2				
18102																														1	
18105																												1			
18106																														1	
18111																												1			
NO FLARE	2	2			1	1	7	4	1						1	1	1		1		1				1	1	1	2			
NO FLARE PATROL			1	1	2	5	2	3			1	2	1				1				1				1	1	1			1	3
NO DATA					1						5	3												1							
EVENT TOTALS	11	4	4	4	4	7	13	12	9	5	7	5	3	1	5	2	2		1		2			1	2	2	4	4		3	3

OBSERVATORIES REPORTING FOR DECEMBER 1981

Ayshire, Scotland (AY)	SES	Lintong, China (LT)	SPA
Cleveland, Ohio, USA (A28)	SES	Louisville, Kentucky, USA (A26)	SES
Darmstadt, GFR (DA)	SWF	Maui, Hawaii, USA (MI)	SWF
Edenvale, South Africa (A52)	SES	Missoula, Montana, USA (A31)	SES, SWF
Eugene, Oregon, USA (A57)	SES	Panska Ves, Czechoslovakia (PU)	SWF, SES, SFA
Eureka, Montana, USA (A55)	SES	Paterson, New Jersey, USA (A46)	SES
Frenchtown, Montana, USA (A56)	SES	Portage, Michigan, USA (A51)	SES
Glenorchy, Tasmania, Australia (GN)	SWF	Sao Paulo, Brasil (UM)	SES, SPA
Hiraiso, Japan (HI)	SWF	Sofia, Bulgaria (SF)	SEA
Hobart, Tasmania, Australia (A43)	SES	St. Cloud, Minnesota, USA (SC)	SES
Houston, Texas, USA (A50)	SES	Thornwood, New York, USA (A48)	SES
Huancayo, Peru (HU)	SWF	Trenton, New Jersey, USA (A30)	SES
Inubo, Japan (IN)	SPA	Tucson, Arizona, USA (A09)	SES
Juliusruh, GDR (JU)	SWF	Upice, Czechoslovakia (UI)	SEA
Kasugai, Japan (KA)	SPA	Valley Cottage, New York, USA (A01)	SES
Kuhlungsborn, GDR (KU)	SES, SPA	Vsetin, Czechoslovakia (VS)	SEA
Lake Hiawatha, New Jersey, USA (A32)	SES	Yakima, Washington, USA (A37)	SES
Latrobe, Pennsylvania, USA (A19)	SES	Zilina, Czechoslovakia (ZL)	SEA

* No Flare Patrol

NF No Flare

Observations are not necessarily continuous for each reporting station.

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

DECEMBER 1981

DAY	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
01	0000	0721	CULG	0000	0300		0000	0310					IN,W
			CULG	0100.5	0104.5	2							IN
			CULG							0104.5	0110	1	SWF
			CULG	0126	0143.5	1							IS
			CULG	0300	0343	1	0310	0536	1				IS,JC
			CULG	0302.5	0303	2	0302.5	0304.5	3	0303	0304	2	IIIG,V
			LEAR				0302.8	0305.0	2				CONT
			CULG				0309.5	0721					IIIN,W
			LEAR				0310.0	0518.8	1				B
			CULG				0314	0440					IIIS,W
			CULG				0316.5	0328.5	2	0316.5	0328.5	2	IIIGG
			CULG	0343	0921	1	0536	0721	1				IN
			CULG	0441.5		3							IIIB
	1035	1445	BLEN				1052.3	1053.4	2				U
			BLEN	1156.0	1156.3	1							DCIM
			BLEN				1213.8	1219.5	2				IIIGG
			BLEN	1250.1	1254.6	2	1250.1	1254.6	2				IIIGG
	1322	1355	WEIS										
	1426	1449	WEIS										
	1411	1335	HARV				1428	1620	2				IN
			BLEN	1435.5	1435.8	1							DCIM
			BLEN				1435.6	1435.6	1				III
			SGMR				1507.6	1508.6	2				V
			HARV				1508		3	1508		2	IIIG,V
			HARV				1513	1514	3	1513	1514	1	IIIG
			HARV				1538		1				IIIG
			HARV				1608	1619	2				IIIN
			HARV				1620	1835	1				IN
			HARV				1700	1702	2	1700	1702	1	IIIG
			CULG				2055	2353.5					IIIN,W
	2055	2400	CULG	2055	2155	1	2055	2200	1				IS
			CULG	2055	2153.5	2							DC,N
			CULG				2130	2311	1				IIIN
			CULG	2155	2400								IS,W
			CULG				2200	2351					IN,W
02	0000	0721	CULG	0000	0721								IS,W
			CULG				0011	0719					IIIN,W
			CULG	0040	0106	1							IS
			CULG				0101.5	0102.5	2	0101.5	0103	2	IIIG
			LEAR				0101.7	0102.6	1				CONT
			CULG	0106	0721	1							IN
			CULG				0125	0354.5					IN,W
			CULG	0205	0205.5	1	0205	0205.5	1				IIIG
			CULG				0354.5	0721					IS,W
			CULG	0404	0404.5	2							DCIM
			CULG	0543	0545	2							DCIM
			LEAR				0718.6	0731.5	1				S
			LEAR				0718.6	0731.5	1				S
			CULG				0719		1				IIIB
	0810	1445	BLEN				0810 D	1445 E	3				I,NS,DL
	0736	1445	WEIS				0832	1255	2				IS,DC
			WEIS				1009.8	1010.8	1				IIIG
			WEIS				1203.2	1203.9	1				IIIG
			WEIS				1214.6	1214.7	1				RS
			WEIS				1357.6	1358.2	2				IIIG
			BLEN				1357.6	1358.2	2				IIIG,V
			BLEN				1429.6	1430.0	2				IIIG
	1412	2325	HARV				1613	1857	2				I
			HARV				1647	2223	2	1729	1935	2	IIIN
			HARV				1706	1711	3	1706	1711	2	IIIGG,V
			HARV				1811	1814	2	1811	1814	2	IIIGG
			HARV				1930	2325	1				IN
			CULG				2021	2340					IIIN,W
	2021	2400	CULG	2021	2155	1	2021	2300	1				IS,DC
			CULG				2038	2338	1				IIIN
			CULG				2038	2227.5	2				IIIN
			LEAR				2222.9	2227.8	1				CONT
			CULG				2223	2223.5	2	2223	2223.5	1	IIIG
			HARV				2223		2				IIIG

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

DECEMBER 1981

DAY	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
02			LEAR				2254.3	2338.3	1				S
			CULG	2322	2322.5	3							IIIG
			HARV	2322	2323	1	2322	2323	3				IIIG
			CULG				2322.5	2323	3	2323		1	IIIB
			LEAR				2322.6	2323.2	2				CONT
			CULG	2331.5	2334	1	2331.5	2334	1				IIIN
03	0000	0721	CULG	0018	0225	1							IN
			CULG				0048	0721					IIIN,W
			LEAR				0052.4	0053.1	1				CONT
			CULG				0052.5		1	0052.5		1	IIIB
			CULG				0102	0158	1				IS,DC
			LEAR				0150.1	0000.0	1				S
			CULG				0151		1				IIIB
			CULG				0314		3	0314.5		1	IIIB
			LEAR				0320.9	0322.0	2				CONT
			LEAR				0350.9	0352.0	2				CONT
			CULG				0351	0351.5	3	0351	0352	2	IIIB
			CULG				0451.5	0630	1				IIIN
			LEAR				0451.6	0452.0	1				CONT
			CULG	0520	0721	1							IN
			CULG				0532.5	0533	2				IIIB,U
			CULG				0618.5		2				IIIB
			LEAR				0629.7	0630.2	1				CONT
			CULG	0646.5	0648	2	0647	0648.5	2				IIIG,V
			LEAR				0647.7	0648.7	2				CONT
			LEAR				0804.8	0806.2	1				CONT
	0759	1131	WEIS				0805.6	0805.8	2				IIIB
	0810	1445	BLEN				0810 D	1115.0	2				I
			BLEN				0932.7	0933.1	2				III
			LEAR				0932.7	0935.2	1				CONT
			BLEN	0956.3	0956.4	2							U
			BLEN				1009.4	1015.0	2				IIIGG
			WEIS				1009.7	1009.9	2				IIIG
			WEIS				1011.7	1014.2	2				IIIG
			LEAR				1012.6	1013.1	1				CONT
			BLEN	1156.5	1156.6	1							U
	1208	1448	WEIS				1218.6	1219.5	2				IIIG
			BLEN				1218.7	1222.9	2				IIIG
			WEIS				1221.5	1223.3	2				IIIGG
			WEIS				1235	1443	1				IN
			BLEN				1235.4	1238.2	2				III
			BLEN				1345	1445 E	2				I
			BLEN				1359.8	1408.9	2				IIIG,U
	1411	2127	HARV	1411	2045	1	1411	2127	2				IN
			HARV				1435	2056	2				IIIN
			BLEN				1438.6	1442.5	2				IIIG
			WEIS				1438.7	1438.9	2				IIIB
			HARV				1439	1442	2				IIIG
			WEIS				1442.1	1442.3	2				IIIB
			HARV	1622		1	1622		3	1622		2	IIIG
			HARV				1659		2	1659		2	IIIG
			HARV				1718	1727	2	1722	1727	2	IIIG
			HARV	1737	1738	2	1737	1738	3				IIIG
			HARV	1810	1812	2	1810	1813	3	1810	1812	2	IIIGG
			HARV				1816	1817	2	1816	1817	2	IIIG
			HARV				1950	1954	3	1950	1954	2	IIIGG
			HARV	2019		2	2019		2				IIIG
	2022	2400	CULG	2022	2151	1							IS
			CULG				2028	2400					IIIN,W
			CULG	2043.5	2045.5	2							DCIM
			HARV				2044	2047	2				IIIGG
			CULG	2046	2047	1	2046	2047	1				IIIG
			CULG	2143	2144.5	2	2144	2144.5	1				IIIG
			CULG	2147.5		2	2147.5		2				IIIB
			CULG	2207	2326								IN,W
04	0000	0721	CULG	0046	0721								IN,W
			CULG	0152	0708	1							IN
			CULG				0156.5	0201.5	1				IIIN

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DAY	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
04			CULG				0157	0158.5	1				IIIG,V
			LEAR				0157.1	0159.1	1				V
			CULG	0643.5	0645.5	2							DCIM
			CULG				0643.5	0644	1				IIIB,V
			CULG				0644.5	0646	2				IIIG,V
			LEAR				0644.8	0646.1	1				V
	0810	1445	BLEN				0810 E	1445 D					I,N
			LEAR				0812.0	0812.5	1				CONT
	0737	1243	WEIS				0812.1	0812.4	2				IIIG
			BLEN				1044.5	1044.6	1				III
			WEIS				1111.2	1111.3	1				IIIB
			WEIS				1149.8	1150.2	1				IIIG
	1258	1447	WEIS				1405.2	1405.8	1				IIIG
			WEIS				1410.7	1411.2	1				IIIG
			BLEN				1428.0	1428.6	2				V
			WEIS				1428.2	1429.1	3				IIIG
			WEIS				1440.4	1440.8	2				IIIG
			BLEN				1440.4	1443.2	2				IIIG
			WEIS				1443.2	1443.3	2				RS
	2107	2400	CULG				2216	2226					IIIN,W
			CULG	2222	2331								IN,W
			CULG				2328	2329	1				IIIB,V
			LEAR				2328.0	2328.8	1				CONT
05			CULG	0000	0722	1							IN
	0000	0722	CULG	0000	0722		0000	0722					IIIN,W
			CULG				0007.5	0707.5	1				IIIN
			LEAR				0007.6	0008.1	1				CONT
			CULG	0030	0030.5	2							IIIG
			LEAR				0030.4	0030.8	1				CONT
			LEAR				0040.0	0041.5	1				CONT
			LEAR				0040.0	0041.5	1				CONT
			CULG				0123.5	0125	2				IIIG
			LEAR				0123.7	0127.5	2				CONT
			CULG				0445	0446	2				IIIG,U
			CULG	0616	0617	2	0617	0617.5	1				IIIG
			LEAR				0616.9	0617.5	1				CONT
			LEAR				0706.4	0710.8	2				CONT
			CULG	0707.5	0708.5	2	0707.5	0710	2				IIIG,V
			LEAR				0734.4	0734.5	1				CONT
	0900	1445	BLEN	0938.5	0938.7	2							DCIM
			BLEN				0955.4	0957.5	2				IIIG
	0736	1447	WEIS				1102.7	1104.9	3				IIIG
			BLEN				1103.3	1108.5	1				IIIGG,U,V
			BLEN	1103.5	1104.6	1							DCIM
			BLEN	1135.1	1139.8	2							DCIM
			BLEN				1137.1	1138.9	2				IIIG,V
			WEIS				1137.2	1140.1	3				IIIGG/V
			BLEN				1152.4	1152.9	2				III,V
			WEIS				1152.5	1153.0	2				IIIG
			WEIS				1219.8	1219.9	1				IIIB
			WEIS				1248.2	1248.4	2				IIIB
			BLEN	1315.4	1320.7	2							DCIM
			BLEN				1315.8	1325.8	2				IIIG,U
			WEIS				1315.9	1318.3	3				IIIGG/V
			SGMR				1316.0	1317.5	1				CONT
			WEIS				1319.6	1326.4	2				IIIGG
			WEIS				1423.1	1424.3	3				IIIG
			PALE				1911.6	1912.3	2				V
			CULG				2023	2400					IIIN,W
	2023	2400	CULG	2023	2400		2023	2400					IN,W
			CULG	2055	2314	1	2055	2400	1				IIIN
			LEAR				2206.9	2207.5	1				CONT
			CULG				2207	2207.5	3	2207	2207.5	3	IIIG
			PALE				2207.1	2207.3	1				III
			LEAR				2312.9	2314.2	1				CONT
			CULG	2339	2339.5	2	2339	2339.5	2				IIIG,U
06	0000	0723	CULG	0000	0723								IN,W
			CULG	0012	0503.5	1	0012	0503.5	1				IIIN

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06			CULG				0014	0504					IIIN,W
			CULG	0227	0227.5	1	0227	0228.5	2	0227	0228.5	2	IIIG,V
			CULG	0236	0236.5	3	0236	0236.5	3	0236	0236.5	3	IIIG
			CULG	0409.5	0410.5	2							DC,M
	0740	1447	WEIS				0755.7	0757.9	3				IIIG
	0825	1445	BLEN				0835.7	0835.9	2				III
			BLEN				0847.7	0852.1	2				IIIG
			WEIS				0850.3	0852.3	3				IIIG
			WEIS				0936.2	0936.4	2				IIIG
			WEIS				0943.2	0945.3	2				IIIG
			BLEN				0944.3	0946.8	2				III,U
			BLEN				1028.8	1028.8	2				III
			WEIS				1033.5	1035.5	2				IIIG
			BLEN				1033.6	1033.9	3				III
			BLEN				1103.0	1104.6	2				I
			WEIS				1104.2	1104.6	2				IIIG
			BLEN				1139.3	1445 D	2				I,N
			WEIS				1151.3	1152.4	2				IIIG
			WEIS				1317	1356	1				IN
			WEIS				1321.2	1321.4	1				IIIG
			WEIS				1419.8	1420.0	1				IIIB
			WEIS				1431.1	1431.3	1				IIIB
	2023	2400	CULG	2025	2116	1							IN
			CULG				2027						IIB,W
07	0000	0723	CULG	0150	0723	1							IN
			CULG				0457	0637					IIIN,W
	0740	1057	WEIS										
			WEIS				0750.7	0751.0	1				IIIG
	0830	1327	BLEN				0830 E	1327 D	2				I,N
			WEIS				0835.2	0836.4	2				IIIG
			WEIS				0950.0	0950.3	2				IIIB
			WEIS				1112.9	1113.1	1				IIIB
			WEIS				1312.2	1312.4	1				IIIB
			WEIS				1315.8	1316.0	1				IIIB
	1104	1447	WEIS				1321	1440	1				IS
	2024	2400	CULG				2024	2100					IS,W
			CULG	2027	2400								IN,W
			CULG	2059	2113	1							DC,N
			CULG				2110	2400					IN,W
			CULG	2345	2400	1							IS
08	0000	0724	CULG	0000	0015	1							IS
			CULG	0015	0105		0000	0724					IN,W
			CULG				0029.5						IIIB,W
			CULG	0036.5	0037		0036.5	0037					IIIG,W
			CULG				0117.5						IIIB,W
			CULG				0405.5		1				IIIB
			CULG	0457	0724								IN,W
			LEAR				0521.1	0522.6	2				CONT
			LEAR				0521.1	0522.6	2				CONT
			CULG	0521.5	0522	2	0521	0522.5	2				IIIG
			CULG				0536						IIIB,W
			CULG				0607.5	0612	1				DC
	0740	1445	WEIS				0932.7	0933.2	1				IIIG
			WEIS				0954.2	0955.9	2				IIIG
			WEIS				1126	1147	1				I
			WEIS	1209.4	1209.7	1							IIIG,DCIM
	1315	1445	BLEN										
			BLEN	1339.5	1340.2	2							DCIM
			BLEN	1421.5	1422.1	2							DCIM
	2024	2400	CULG	2024	2400	1							IS
			CULG				2035	2155					IN,W
			CULG				2038	2400					IIIN,W
			CULG				2155	2450	1				IS
09			CULG				0000	0720					IIIN,W
	0000	0720	CULG	0000	0920	1							IS
			CULG				0000	0720					IN,W
			LEAR				0100.5	0149.1	1				S

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DAY	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS: DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
09			LEAR				0100.5	0149.1	1				S
			CULG				0128	0439	1				IIIN
			LEAR				0202.0	0247.2	1				S
			LEAR				0202.0	0247.2	1				S
			CULG				0346	0410	1	0344	0411	2	SWF
	0742	1446	WEIS				0746	1445	1				IN
	0830	1445	BLEN				0830 E	1445 D	2				I,N
			PALE				1900.1	0128.0	2				B
			PALE				1900.1	0000.0	2				B
			PALE				1900.1	0128.0	2				B
			PALE				1900.1	0000.0	2				B
			SGMR				1900.2	1912.8	2				CONT
			SGMR				1900.2	1912.8	2				CONT
			CULG				2033	2400					IIIN,W
	2033	2400	CULG	2033	2125	2	2033	2127	2				IS,C,P
			CULG	2125	2225	1	2127	2225	1				IS,DC
			CULG				2158.5		1				IIIB
			CULG	2225	2400	1	2225	2400	1				IN
			CULG				2315	2315.5	1				IIIG
			LEAR				2315.2	2316.0	1				CONT
			LEAR				2351.3	2352.1	1				CONT
			CULG				2351.5		1	2351.5		1	IIIB,V
10	0000	0725	CULG	0000	0725	1							IN
			CULG				0000	0208	1				IS
			CULG				0021	0725					IIIN,W
			CULG				0200	0230	1				IS,DC
			CULG				0230	0725	1				IN
	0743	0924	WEIS										
	0830	1430	BLEN				0830 E	1300.0	2				I,N
			BLEN				1136.3	1136.8	2				III
	0929	1446	WEIS				1258.9	1259.2	1				IIIG
			BLEN				1258.9	1259.0	1				III
			BLEN				1328.8	1328.9	1				III
			BLEN				1400.6	1400.7	1				III
			PALE				1900.1	1909.0	2			IV	
			PALE				1909.0	0128.0	1				B
	2025	2400	CULG	2025 2	2125	1							IN
			CULG				2025	2400					IN,W
			CULG				2025	2400					IIIN,W
			CULG	2125	2235	1							IS
			CULG	2235	2400								IN,W
11	0000	0725	CULG	0000	0725								IN,W
			CULG				0147	0657					IIIN,W
			CULG				0205	0224	1				IS
			LEAR				0309.9	0316.6	1				CONT
			CULG				0310	0310.5	1				IIIG
			CULG				0313	0316	1				I,RSDC
			CULG				0314.5	0315.5	1				IIIG
			LEAR				0440.3	0440.4	1				III
	0830	1445	BLEN				0830 E		1				I,N
			BLEN				1126.2	1126.5	2				IIIG
			WEIS				1337	1441	2				I
	0744	1446	WEIS				1344.2	1344.3	1				IIIB
			WEIS				1346.5	1346.6	2				IIIB
			WEIS				1348.3	1348.4	1				IIIB
			HARV	1403	2332	1							INW
	1403	2340	HARV				1403	1453	3				I
			HARV				1453	2337	2				IN
			HARV				1752	1755	1	1754	1755	1	IIIGG
			HARV				1805	2325	2				IIIN
			HARV	1850		2	1850		2				IIIG
	2025	2400	CULG	2025	2400	1							IS
			CULG				2156	2400					IIIN,W
			CULG				2217.5	2331.5	1				IIIN
			HARV	2228		1	2228		2				IIIG
			LEAR				2258.8	2259.3	1				CONT
			CULG				2259		2				IIIB
			HARV				2259		2				IIIG

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				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
11			HARV				2328	2331	2				IIIGG
			LEAR				2328.9	2331.5	1				CONT
			CULG	2329		1	2329		1	2329		1	IIIB
12	0000	0725	CULG	0000	0725	1							IS,DC
			CULG				0001	0056	1				IIIS
			LEAR				0004.7	0006.5	1				CONT
			LEAR				0010.4	0012.2	2				CONT
			CULG				0010.5	0401	2	0010.5	0401	1	IIIG,N
			CULG				0018	0442	1				IS,DC
			LEAR				0030.5	0035.5	1				CONT
			LEAR				0039.0	0000.0	1				S
			CULG				0043	0722	2				IIIN
			CULG				0056	0720					IIIN,W
			CULG				0144	0721.5	1				IIIN
			LEAR				0207.8	0216.3	2				CONT
			LEAR				0218.8	0222.6	2				CONT
			LEAR				0230.5	0239.5	1				CONT
			CULG							0328	0345		SWF,W
			LEAR				0348.9	0351.8	3				CONT
			CULG				0349.5	0351.5	3	0350	0351.5	2	IIIGG
			LEAR				0355.3	0356.5	2				CONT
			CULG				0355.5	0356	3	0355.5	0336	2	IIIG
			LEAR				0359.6	0401.8	2				CONT
			LEAR				0602.0	0611.3	1				CONT
			LEAR				0702.3	0708.6	1				CONT
			LEAR				0720.0	0722.0	1				CONT
			LEAR				0720.0	0722.0	1				CONT
			LEAR				0733.2	0750.0	1				S
	0830	1445	BLEN				0830 E	1445 D	2				I,N
			WEIS				0838	1441	3				IN,DC
	0745	1445	WEIS				0927.2	0927.3	1				IIIB
			WEIS				1016.3	1016.5	1				IIIB
			WEIS				1033.7	1033.9	1				IIIG
			WEIS				1052.3	1052.8	1				IIIG
			WEIS				1104.2	1105.3	1				IIIG
			WEIS				1407.9	1408.8	2				IIIG
	1404	2340	HARV				1408	2244	2				IIIN
			HARV	1425	2255	1	1410	1615	2				IN
			WEIS				1426.3	1426.4	2				IIIB
			WEIS				1430.2	1430.3	2				IIIG
			HARV				1449	1451	2				IIIGG
			HARV				1504	1507	2				IIIGG
			HARV				1615	1700	3				I
			HARV				1629	1631	2				IIIGG
			HARV	1640	1649	2	1646	1649	2				IIIGG
			HARV				1700	2332	2				IN
			HARV				1726		2	1726		1	IIIG
			HARV				1826	1829	2				IIIGG
			HARV				1838	1839	2				IIIG
			HARV				1857	1858	2				IIIG
			HARV				1915	1917	2	1916		1	IIIG
	2025	2400	CULG	2025	2400	1							IN
			CULG				2025	2400					IIIN,W
			HARV				2039	2042	2	2039	2040	1	IIIGG
			CULG				2040	2042	2				IIIGG
			HARV				2104	2105	2	2104	2105	1	IIIGG
			CULG				2104	2256	1				IIIN
			CULG							2212	2332	1	IIIN
			HARV				2212	2214	2				IIIGG
			HARV				2254	2256	2				IIIG
13	0000	0726	CULG				0018	0718	1	0018	0525	1	IIIN
			LEAR				0018.4	0021.0	1				CONT
			CULG				0058	0059	2	0058	0059	2	IIIG
			LEAR				0058.3	0100.9	2				CONT
			LEAR				0105.0	0105.3	1				III
			CULG				0106	0725					IIN,W
			LEAR				0119.3	0121.7	1				CONT
			LEAR				0143.8	0217.5	1				S

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DAY	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS: DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
13			LEAR				0313.0	0313.9	1				CONT
			LEAR				0321.4	0326.0	1				CONT
			LEAR				0347.8	0423.2	1				S
			CULG				0349.5	0350	2	0349.5	0350	2	IIIG
			CULG				0401	0430	1				IS
			CULG				0418	0419.5	2	0418	0419.5	2	IIIGG
			LEAR				0517.8	0518.3	1				CONT
			LEAR				0524.5	0525.0	2				CONT
			LEAR				0527.7	0607.3	1				S
			CULG	0604	0636								IN,W
			CULG	0636	0726	1							IS
			LEAR				0643.5	0652.2	1				CONT
			CULG				0654		2				IIIB
			LEAR				0716.9	0724.2	2				CONT
			CULG				0719	0722.5	3				IIIGG
	0746	0827	WEIS										
	0830	1445	BLEN				0830 E	1445 D	1				I,N
			LEAR				0857.5	0858.6	1				CONT
	0836	1445	WEIS				0858.0	0858.4	2				IIIG
			WEIS				0915.2	0915.7	2				IIIG
			BLEN				0917.2	0919.2	1				IIIG
			WEIS				0919.0	0919.2	1				IIIG
			BLEN				0934.8	0935.8	2				III
			LEAR				0935.5	0936.6	1				CONT
			WEIS				0935.6	0937.3	2				IIIG
			WEIS				0941.4	0941.7	1				IIIG
			WEIS				0950.6	0950.7	2				IIIB
			WEIS				0953.4	0956.3	1				IIIG,RS
			WEIS				1006.2	1008.2	1				IIIG
			BLEN				1012.9	1013.1	1				III
			WEIS				1034.8	1034.9	1				IIIB
			WEIS				1044.1	1045.1	2				IIIGG
			BLEN				1044.2	1045.2	1				IIIG
			WEIS				1240.1	1240.2	2				IIIB
			WEIS				1242.7	1242.9	2				IIIB
			WEIS				1245.1	1248.7	2				IIIGG
			BLEN				1245.3	1255.6	1				IIIG
			WEIS				1249.7	1302.9	1				IIIGG
			WEIS				1306.9	1307.0	1				IIIB
			WEIS				1317.9	1318.0	1				IIIB
	1404	2340	HARV				1502	2319	1				IN
			HARV	1533		1							IIIB
			HARV				1557	1558	2				IIIG
			HARV				1609	2136	2				IIIN
			HARV	1742	2126	1							INW,IIINW
			HARV				1837		2	1837		1	IIIG
			HARV				1853		2				IIIG
	2026	2400	CULG				2026	2256					IIIN,W
			CULG	2034	2355	1							IN
			CULG				2047	2138	1				IIIN
			HARV				2052		1	2052		1	IIIG
			CULG	2127	2128	2							UNCLF
			CULG	2143	2144	1	2143	2145	3	2144	2145	1	IIIGG,V
			HARV				2143	2145	3	2144		2	IIIGG,V
			PALE				2143.7	2145.1	2				V
			LEAR				2143.8	2144.5	1				CONT
14	0000	0725	CULG				0014	0725					IIIN,W
			CULG	0039	0704								IN,W
			LEAR				0343.3	0347.6	1				CONT
			CULG							0347	0429		IIIN,W
			CULG				0415.5		1	0415.5		1	IIIB
			LEAR				0415.6	0513.2	1				S
			CULG				0512.5		2				IIIB
			LEAR				0517.8	0608.3	1				S
			CULG				0518		1				IIIB,U
			CULG				0542	0702	1				IIIN
			LEAR				0619.3	0702.2	1				S
			LEAR				0736.0	0820.4	1				S
	0747	1337	WEIS				0824	1445	2				IN

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				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
14			BLEN				0825 E	1030.0	1				I,N
	0825	1445	BLEN				0828.8	0828.9	1				III
	1417	1445	WEIS	0828.8	0829.0	1							IIIG
			BLEN				1144.8	1144.9	2				III
	1404	2340	HARV				1404	1848	2				I
			HARV				1526	1527	2				IIIG
			HARV				1602	1603	2				IIIG
			HARV				1611	1620	1				IIIG
			HARV				1848	2238	1				IN
			HARV	1953		1	1953		2				IIIG
	2030	2400	CULG				2034.5	2348					IIIN,W
			CULG	2052.5	2400								IN,W
			CULG	2142	2143	1							DCIM
			HARV				2143		2				IIIG
			CULG	2332	2332.5	1							IIIG
			HARV				2332	2333	2				IIIG
15	0000	0727	CULG	0008	0558								IN,W
			CULG				0044	0628.5					IIIN,W
			CULG				0132	0544	1				IIIN
			LEAR				0132.0	0132.5	1				CONT
			LEAR				0439.9	0440.4	1				CONT
			LEAR				0439.9	0440.4	1				CONT
			CULG	0440	0440.5	1	0440	0440.5	1				IIIG
			CULG				0526.5	0711.5					IN,W
			LEAR				0543.6	0545.1	1				CONT
			LEAR				0600.5	0601.3	1				CONT
	0830	1010	BLEN										
	0749	1248	WEIS				1117	1306	2				IS
	1253	1445	WEIS				1133.9	1134.4	1				IIIG
			WEIS				1314.5	1322.0	1				IIIG
			WEIS				1404.4	1404.6	2				IIIB
			WEIS				1433.1	1433.3	1				IIIB
	1404	2340	HARV	1526	2333	1	1530	2335	1				IN
			HARV	1626	1627	2	1626	1627	2				IIIGG
			HARV				1901		2	1901		2	IIIB
			HARV	1945	1946	2	1945	1950	2	1949	1950	1	IIIGG,V
			PALE				1948.9	1950.0	1				V
			HARV				1951	1956	2				II
			HARV	1954	1956	2	1954	1955	2				IV
			HARV				2000		2				IIIB
	2027	2400	CULG	2029	2352	1							IN,W
			HARV				2037		2	2037		1	IIIB
			CULG				2037		2				IIIB,V
			CULG	2102		1	2102		1				IIIB
			HARV				2102		1				IIIB
			CULG				2104.5	2350.5					IIIN,W
			HARV				2141		1				IIIG
16	0000	0727	CULG	0029.5		1							I
			CULG	0046.5		1							I
			CULG				0049	0546.5					IIIN,W
			CULG	0514	0712.5	1							IN
	0749	1445	WEIS										
	1404	2340	HARV				1636	2333	1				IN
	2028	2400	CULG	2031	2400	1							IN
17	0000	0728	CULG	0002.5	0719	1							IN
	0750	1445	WEIS				1107.4	1107.5	1				IIIB
	1404	2310	HARV				1526	2300	1				IN
			HARV				2015	2016	2				IIIGG
	2029	2400	CULG										
18	0000	0728	CULG				0221	0221.5	1				IIIG
			CULG				0401						IIIB,W
			CULG	0449	0551	1	0449	0551.5	1				IIIGG,U,V
			LEAR				0449.4	0451.8	1				III
			LEAR				0524.9	0525.3	1				III
			CULG				0525		1				IIIG
	0751	1210	WEIS										

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				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
18	1218	1445	WEIS										
	1404	2340	HARV				1424	1425	1				IIIG
			HARV				1504		1				IIIG
			HARV				1853	1854	1				IIIB
			HARV				1922	1923	1				IIIG
	2028	2400	CULG										
			PALE				2240.0	2245.8	2				CONT
19			LEAR				0010.9	0012.5	1				III
	0000	0728	CULG				0011	0012	2	0011	0012.5	1	IIIG,V
			LEAR				0534.5	0535.2	1				III
			LEAR				0720.2	0722.1	1				III
			CULG				0720.5	0721	1				IIIB,U
			CULG				0721.5	0722					IIIB,V,W
			LEAR				0738.6	0740.1	2				III
	0751	1446	WEIS										
	1404	2340	HARV										
	2030	2400	CULG										
20	0000	0729	CULG				0632	0632.5					IIIG,W
	0752	1446	WEIS										
	1404	2340	HARV				1602		1				IW
	2030	2400	CULG										
21	0000	0729	CULG										
	0753	0824	WEIS										
	1145	1446	WEIS										
	1404	2345	HARV										
	2030	2400	CULG				2112.5	2114					IIIG,U,W
			CULG				2125.5		1				IIIB
22	0000	0730	CULG				0417	0418					IIIG,W
			LEAR				0904.8	0906.9	2				III
	0754	1447	WEIS				0904.8	0906.7	2				IIIG
	1412	2345	HARV				1518	1519	1				IIIB
	2030	2400	CULG										
23	0000	0730	CULG										
	0756	1448	WEIS				1108.1	1108.6	1				IIIG
			WEIS				1154.4	1154.7	1				IIIG
			WEIS				1324.8	1325.9	1				IIIG
			WEIS				1353.6	1353.7	2				IIIG
	1416	2340	HARV				1532		2				IIIG
			HARV	1626		1	1625	1630	2	1625	1630	2	IIIGG
			HARV	1751	1759	1	1751	1759	1				I
			HARV				1752	1757	2				IIIG
	2031	2400	CULG				2040.5	2330					IIIN,W
			HARV				2159		2				IIIB
			CULG				2159.5	2228	2				IIIN
			HARV				2226	2228	2				IIIG
			CULG				2226		2	2226		1	IIIB
			LEAR				2333.9	2334.3	2				III
			CULG	2334	2334.5	2	2334	2334.5	2	2334	2334.5	2	IIIG
			HARV	2334		1	2334		2				IIIG
24	0000	0730	CULG				0349	0349.5	2	0349	0349.5	1	IIIB
			LEAR				0349.0	0349.3	1				III
			CULG				0509.5	0520					IIIS,W
			CULG				0554.5	0555	1				IIIG
			CULG				0631.5	0632.5	1				IIIG
			LEAR				0812.2	0812.6	1				III
			LEAR				0812.2	0812.6	1				III
	1107	1449	WEIS										
	1130	1445	RLEN										
	0756	1101	WEIS				1146.9	1147.3	1				IIIG
	1409	2345	HARV				1534		1				IIIG
			HARV				1749	1751	2				IIIG
			HARV	1827		1	1827	1828	3	1827	1828	2	IIIG
			HARV				1837	1838	2				IIIG
			HARV	1841		1							IIIGW

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DAY	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
24	2055	2400	CULG										
			CULG				2148.5	2158.5					IIIN,W
25			LEAR				0606.9	0607.6	1				III
	0000	0732	CULG				0607	0607.5	2				IIIG,U
			CULG				0651						IIIB,W
	0756	1449	WEIS										
	0830	1445	BLEN										
	1413	2345	HARV										
	2033	2400	CULG										
26	0000	0732	CULG				0612						IIIB,W
	0756	1450	WEIS										
	0830	1450	BLEN										
	1413	2345	HARV				1911	1912	1				IIIG
	2033	2400	CULG				2103	2329.5					IIIN,W
			HARV	2209	2210	1	2209		2				IIIG
			CULG	2209.5		1							I
			HARV	2313		2	2313		2				IIIG
			CULG	2313		1							I
27	0000	0733	CULG				0055	0724					IIIN,W
			LEAR				0149.2	0149.9	1				III
			LEAR				0245.2	0246.3	1				III
			CULG				0245.5	0247	1				IIIG
			CULG				0246	0733	1				IV
			CULG				0250.5	0300	2	0252.5	0300	2	II H
			LEAR				0250.6	0308.3	2				CONT
			CULG	0424	0425.5	1	0424	0425.5	2	0424	0425.5	1	IIIGG
			CULG				0433		1				IIIB
			LEAR				0709.2	0715.1	2				III
			CULG				0709.5		2				IIIB
			CULG	0714.5		2	0714.5		3				IIIB
			CULG	0715		2	0715		2				IIIB
	1007	1451	WEIS				0756	1050	2				CONT
	0756	1003	WEIS				0803	1450	2				IN
	0840	1450	BLEN				1121.3	1121.4	2				III
			WEIS				1121.3	1121.5	2				IIIG
			BLEN	1127.5	1128.1	2							DCIM
			BLEN				1140.5	1140.8	2				U
			SGMR				1238.0	1434.0	1				B
	1413	2350	HARV				1413	1640	2				I
			HARV				1632	1635	1				IIIG
			HARV				1640	1940	1				IN
	2033	2400	CULG				2034.5	2331	1				IN
			HARV				2303	2310	2				IIIGG
			LEAR				2304.0	2323.0	1				S
			CULG				2304.5	2321.5	1				IIIS
			HARV				2316	2332	1				IN
			HARV				2321	2322	2				IIIG
28			LEAR				0106.3	0106.8	1				III
			LEAR				0123.4	0532.0	1				B
	0000	0733	CULG				0311.5		1				IIIB
			CULG				0313.5						IIIB,W
	0756	1451	WEIS				1305.3	1320.7	2				IIIGG
	0840	1450	BLEN				1306.5	1323.7	1				IIIGG
			BLEN				1312.2	1355	1				I,N
			WEIS				1330.6	1334.8	1				IIIG
			WEIS				1344.4	1346.5	1				IIIG
	1414	2350	HARV				1450	1452	1				I
			HARV				1712	1753	1				IN
			HARV				1749		2				IIIB
			HARV				1904		2				IIIB
	2033	2400	CULG				2043.5	2048	1				II
			CULG				2131						IIIB,W
29	0000	0733	CULG	0128		2							I
			CULG				0417.5	0418.5	1				IIIG
			LEAR				0418.0	0418.4	1				III

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29			CULG				0634						IIIB,U
			CULG				0637.5		2				IIIB,U
			CULG	0638	0638.5	2	0638	0639.5	2				IIIG,U,V
			LEAR				0638.1	0638.6	2				III
			LEAR				0810.8	0823.4	1				CONT
	0756	1452	WEIS				0820.3	0822.6	1				IIIG
	0850	1450	BLEN										
	1413	2340	HARV				1603	1938	1				INW
	2035	2400	CULG	2047	2049	1							I
			HARV	2048		1	2047	2049	2				IIIGG,RS
30	0000	0734	CULG							0145.5	0147	1	IIIB,V
			CULG				0229	0230	2				DC
			CULG				0230	0440	1				CONT
			CULG	0324.5	0325	1	0323.5	0325	3	0324	0325	2	IIIG
			CULG				0327.5	0328	3	0327.5	0328	2	IIIG
			CULG				0328.5	0332	2	0328.5	0332	2	IIIGG
			CULG				0454	0455					IIIG,W
			CULG				0519		1				IIIB
			CULG				0539						IIIB,W
			CULG				0639.5	0640					IIIG,W
	0756	0911	WEIS				0813.3	0813.5	2				IIIB
			WEIS				0819.5	0820.8	2				IIIG
			WEIS				0823.2	0825.3	3				IIIGG
			WEIS				0827.3	0827.6	3				IIIG
			WEIS				0853.0	0856.3	3				IIIGG
	0850	1450	BLEN				0854.7	0856.3	2				IIIG
			WEIS				0907.4	0907.2	3				IIIG
			BLEN	1026.6	1026.7	2							U,RS
	0917	1452	WEIS				1159.3	1159.6	2				IIIG
	1413	2340	HARV				1510		3	1510		1	IIIG
			HARV				1521	1523	2				IIIG
			HARV				1642	1643	1				IIIBW
			HARV				1722		2				IIIG
			HARV	1819		1	1818	1819	2				IIIG
			HARV	1823	1824	2	1823	1824	2				IIIG
			HARV				1857	1858	2				IIIB
			HARV	2043	2053	2	2043	2054	3	2043	2053	3	IIIGG,V
	2035	2400	CULG				2043.5	2044	3	2043.5	2044	2	IIIB,W
			CULG				2044.5	2054.5	2	2047	2048.5	2	IIIGG
			PALE				2047.2	2048.8	1				V
			PALE				2047.2	2048.8	1				V
			CULG				2140.5	2349					IIIN,W
			HARV	2220	2223	2	2220	2227	3	2221		1	IIIGG
			LEAR				2220.7	2222.6	1				III
			CULG	2221	2222.5	1	2219.5	2224	2				IIIG,V
			CULG				2226	2233	1			II	
			HARV				2229	2232	3			II	
			LEAR				2229.0	2231.5	1			II	
			LEAR				2229.0	0000.0	1			II	
			LEAR				2237.8	2238.5	1				III
			CULG				2238	2238.5	2	2238	2238.5	1	IIIG,V
			HARV	2323		1							IIIB
31	0000	0735	CULG	0127.5		1	0127.5		1				IIIB,V
			CULG				0150.5	0151.5		0151.5	0152		IIIG,W
			LEAR				0738.9	0739.2	1				III
	0756	1452	WEIS				0925.8	0926.0	2				IIIG
	0845	1050	BLEN				0925.8	0926.6	2				IIIG
			WEIS				1046.1	1047.4	3				IIIG
			BLEN				1046.1	1046.6	2				IIIG
			LEAR				1046.3	1047.2	2				III
			WEIS				1206.4	1206.6	3				IIIB
			WEIS				1207.8	1207.9	1				IIIG
			WEIS				1227.3	1228.3	1				IIIG
			WEIS				1349.6	1350.0	2				IIIB
			WEIS				1351.1	1352.7	3				IIIG
			WEIS				1428.6	1428.8	1				IIIG
	1413	2340	HARV				1436	1437	1				IIIGW
			WEIS				1436.3	1436.3	2				IIIB

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

DECEMBER 1981

DAY	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
31			HARV				1629	1630	1				I
			HARV	1722	1723	2							IIIG
			HARV	1848		2	1848		1				IIIG
			HARV				1920	1923	1	1920	1923	1	IIIG
			HARV				2044	2106	2	2044	2102	1	IIIG
	2035	2400	CULG				2044	2046	1				IIIG
			CULG				2101.5	2104	2				IIIG
			HARV				2110	2123	2				II
			CULG				2110	2125	1				II
			HARV				2119	2340	1				IN
			CULG				2145	2400					IN,W
			CULG				2219	2335					IIIN,W
			HARV				2222		1				IIIBW

The symbols used under the column heading SPECTRAL TYPE have the following definitions:

B = Single burst
G = Small group (< 10) of bursts
GG = Large group (> 10) of burst
C = Underlying continuum (particularly with Type I)
S = Storm in the sense of intermittent but apparently connected activity
N = Intermittent activity in this period
U = U-shaped burst of Type III

RS = Reverse slope burst
DP = Drifting pairs
DC = Drifting Chains
H = Herringbone
W = Weak
P = Pulsations
CONT = Continuum
UNCLF = Unclassified activity
DCIM = Fast drift

COSMIC RAY INDICES

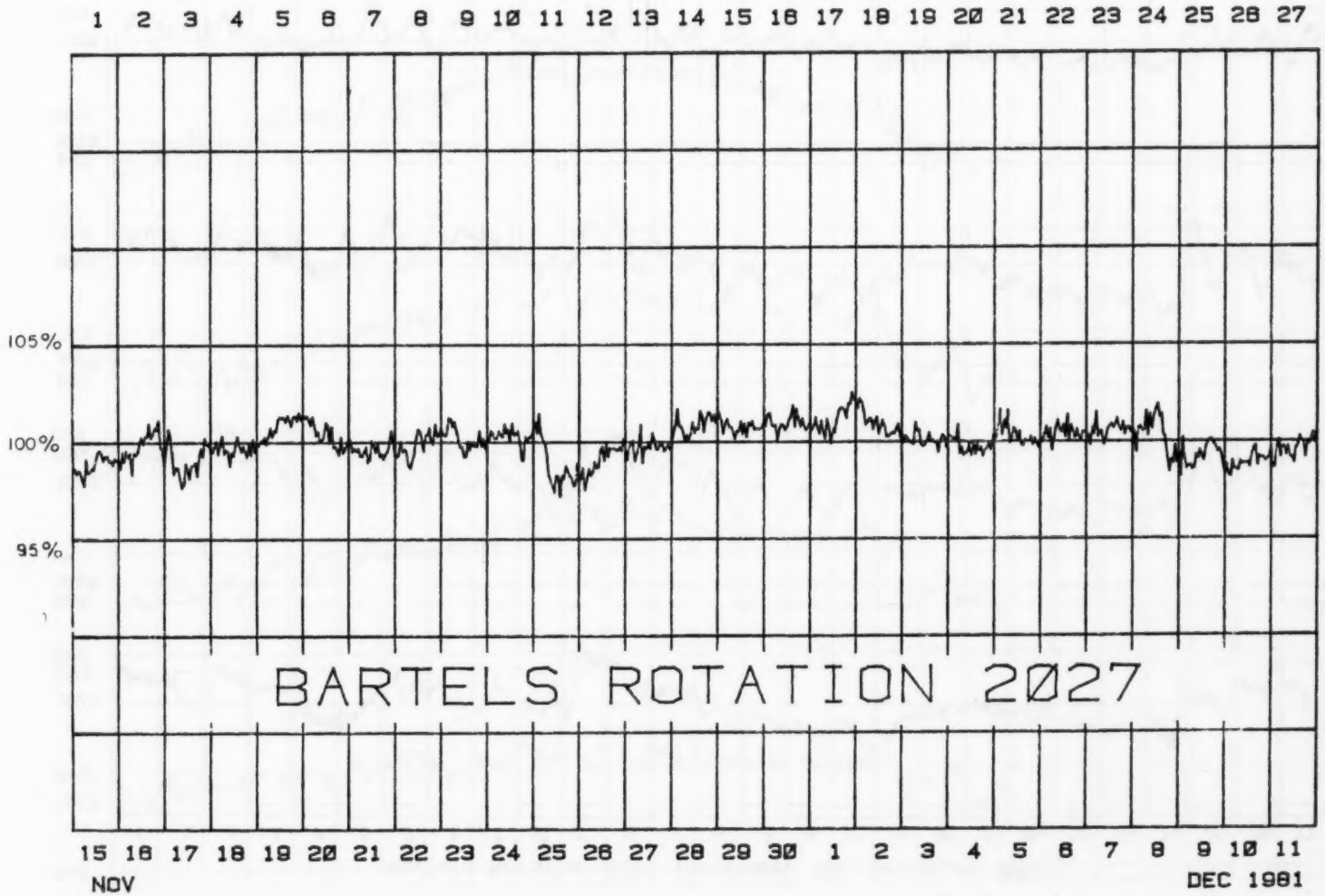
(Neutron Monitors)

DECEMBER 1981

Dec 1981	THULE Average (cts/h)/100	ALERT Average (cts/h)/100	DEEP RIVER Average (cts/h)/300	KIEL Average (cts/h)/100	CLIMAX Average (cts/h)/100	TOKYO Average (cts/h)/100	HUANCAYO Average (cts/h)/100)
1	4042	6608.0	6237.7	5657.5		3537.2	
2	4032	6585.3	6199.5	5617.6		3559.5	
3	3999	6537.8	6184.1	5597.7		3546.7	
4	3987	6528.1	6204.5	5630.1		3551.2	
5	4008	6547.4	6231.8	5673.1		3553.5	
6	4014	6582.1	6259.5	5682.0		3566.8	
7	4019	6582.7	6241.3	5684.4		3566.6	
8	4009	6557.5	6236.7	5680.3		3556.1	
9	3965	6501.3	6155.2	5580.9		3536.5	
10	3953	6459.5	6168.9	5606.1		3538.8	
11	3982	6487.4	6195.7	5624.4		3531.3	
12	3988	6528.8	6188.9	5588.0		3530.8	
13	4014	6588.3	6203.0	5635.0		3545.2	
14	4016	6591.3	6197.2	5646.5		3546.6	
15	4044	6642.9	6229.1	5672.7		3558.7	
16	4086	6683.5	6303.4	5705.3		3561.1	
17	4092	6691.9	6323.4	5715.7		3572.0	
18	4093	6697.1	6351.3	5731.5		3575.2	
19	4129	6755.9	6388.6	5757.6		3568.3	
20	4158	6816.2	6422.7	5793.8		3584.8	
21	4178	6839.2	6429.6	5836.3		3602.8	
22	4175	6822.6	6427.3	5844.9		3598.8	
23	4179	6828.5	6431.2	5842.2		3598.0	
24	4187	6830.5	6418.7	5837.1		3599.2	
25	4162	6804.4	6416.3	5795.5		3587.5	
26	4140	6770.2	6397.1	5789.3		3584.8	
27	4125	6739.5	6400.9	5781.4		3584.4	
28	4125	6729.7	6383.3	5791.1		3584.1	
29	4084	6664.5	6296.5	5720.0		3564.2	
30	4010	6566.0	6242.8	5636.0		3550.4	
31	3991	6530.3	6162.9	5590.2		3529.7	
MEAN	4064	6648.4	6288.1	5701.4		3563.6	

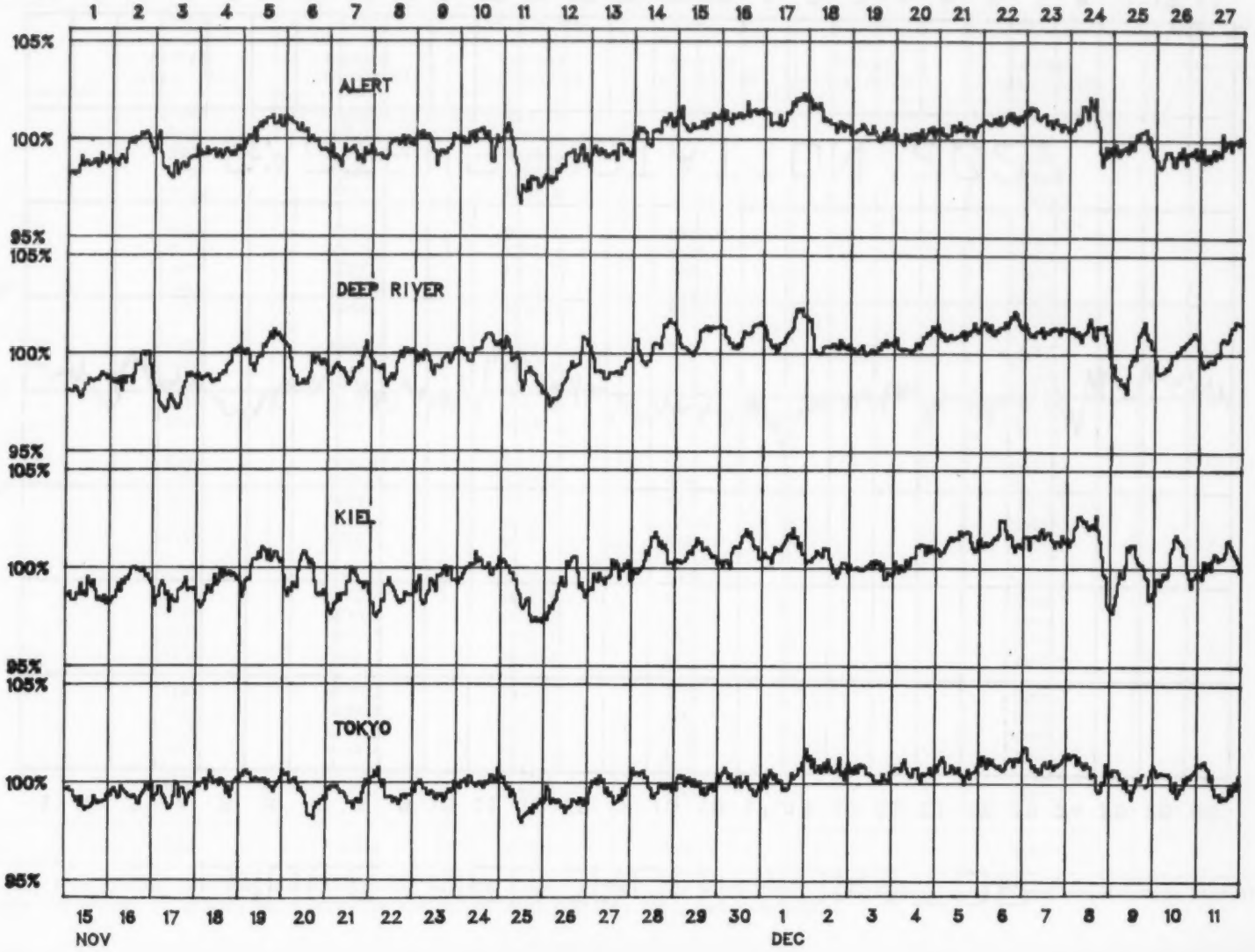
For less than 24-hour coverage, parentheses enclose the number of hours for which data are available. For Climax and Huancayo, parentheses enclose the number of section hours whenever the sum of both sections falls below 40 hours.

THULE NEUTRON MONITOR



COSMIC RAY INDICES
(Neutron Monitor)

Bartels Rotation 2027 (November 1981–December 1981)



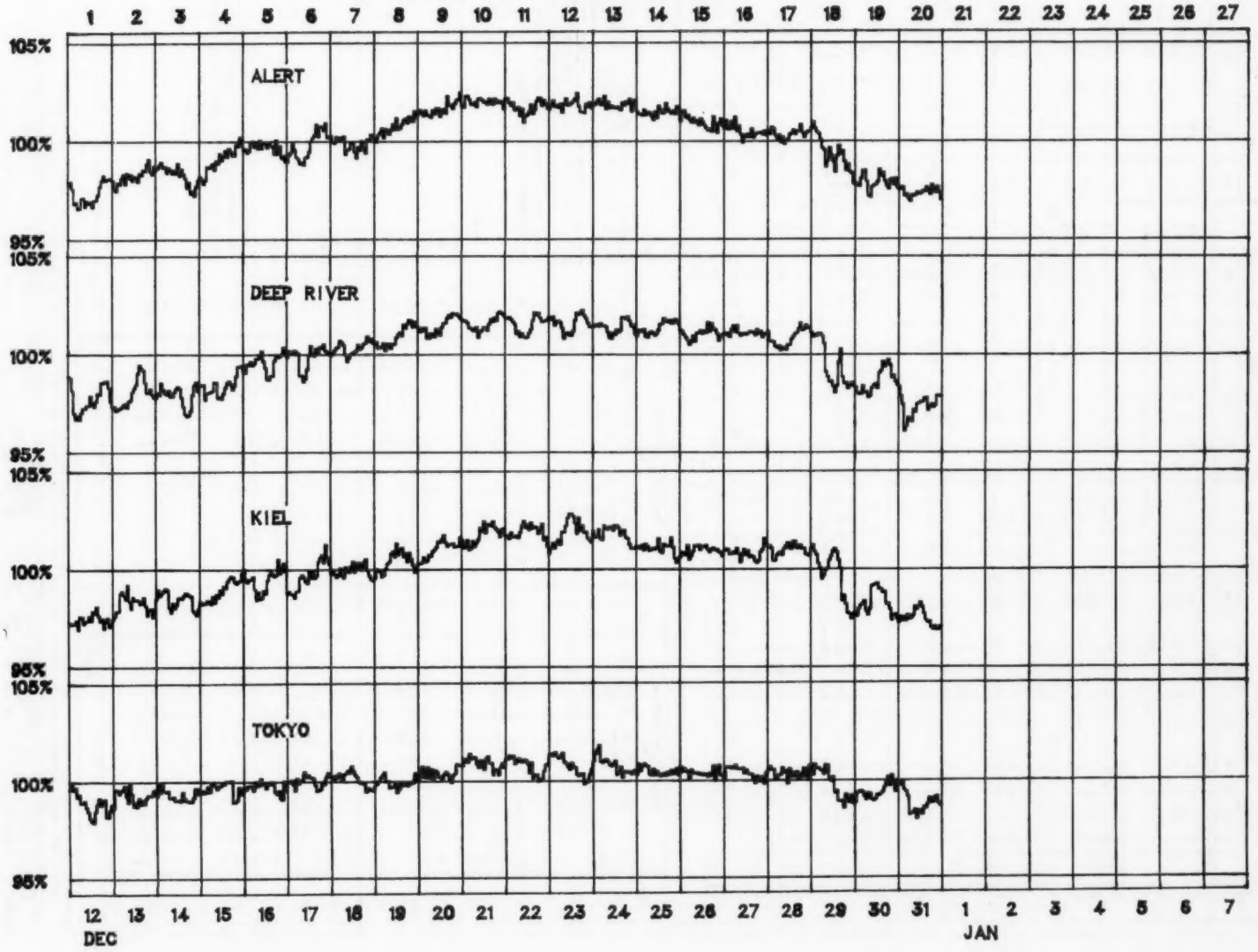
COSMIC RAY INDICES

NOV

DEC

COSMIC RAY INDICES
(Neutron Monitor)

Bartels Rotation 2028 (December 1981–January 1982)



GEOMAGNETIC ACTIVITY INDICES

DECEMBER 1981

Day	Three-Hourly Indices Kp									Ap	Cp	Three-Hourly Indices Km								Am	aa			
		1	2	3	4	5	6	7	8	Sum			1	2	3	4	5	6	7	8		N	S	M
1		0+	1-	1	1+	2	3	2+	2	13-	6	0.3	1-	1+	1+	2-	2+	3	2+	2	15	12	17	8 20
2		2	1	1+	4-	2	1+	2+	3-	16+	9	0.5	2-	1+	2	4-	3-	2	3	3	22	21	24	22 23
3		1	2-	1+	2+	3	2	3-	2+	16+	8	0.5	1+	2	2-	2+	3	2+	3-	3-	19	16	20	12 24
4		3	3+	2+	2+	2	2-	2	3-	19+	10	0.6	3	3	2	2+	2	2	3-	2+	20	17	18	21 14
5		3-	2	2+	2+	1+	2-	2+	3-	17+	9	0.5	2-	1+	2-	2+	1+	2-	2+	2+	14	20	13	15 17
6	Q4	2-	2+	2-	0+	0+	1	1-	0+	8+	4	0.1	1+	2-	1+	0	1-	2-	0+	1-	7	8	8	10 6 CC
7	Q2	0	0	1-	1	1	1	1-	2	6+	3	0.1	1	1-	1	1+	1+	1+	1-	2	8	6	12	5 14 CK
8	D5*	2	2+	3	1	3	4	4+	3-	22+	15	0.9	2	2	2+	1+	3+	4+	4+	3	31	31	38	19 50
9		3-	3	2	2+	2	2+	3-	3-	20-	10	0.6	2	3	2	3	3-	2+	4-	3+	26	19	35	23 32
10		2	4	3	2	1-	1+	1-	1	15-	9	0.5	2	3+	3	2	1	2-	1-	1+	16	12	23	30 6
11	Q8	2+	2+	0+	1-	1	2-	2	2-	12	6	0.3	2	2	1	1	1	2+	2-	2-	11	10	10	10 11 C
12	D3	3+	2+	3	3	5-	4+	4	4	29-	23	1.1	4-	3-	3+	3	5-	4	4-	4	45	36	55	34 57
13		3+	4-	3+	3-	3	2	1	1	20	12	0.7	3-	3-	3	3	4-	2+	1+	1+	23	19	27	27 19
14	Q7	2	2+	1+	1+	1-	1+	2	1+	12+	6	0.3	2+	2	1+	1+	1	2-	2+	1+	12	10	13	13 9 CK
15	Q0K	1+	1	1-	0+	0+	0+	3	3+	10+	6	0.3	1+	2-	1+	1-	0+	0	3	3-	12	12	12	9 15 KK
16	Q3	1+	0	1+	1+	0+	1-	2-	2	9-	4	0.1	2-	1-	2-	2-	0+	1	2	2-	9	9	8	8 10 CK
17		0+	0+	0+	1	1-	2-	3-	4	11	7	0.4	1+	1-	0+	1+	1	2	3-	3+	13	19	11	6 25
18		4	3	3	3	2+	3	2+	2+	23	14	0.8	3+	2+	3-	3-	3-	3	3-	2+	25	25	22	26 21
19		2+	2-	2	3+	3+	2+	1	2-	18-	10	0.5	2	2-	2-	3-	3-	2+	1+	2-	15	21	19	19 20
20		2-	2+	1+	1+	1	2-	2	2	13+	6	0.3	1	2-	1+	2-	1+	2-	2-	2+	11	14	11	11 14 C
21	Q5	2-	1	1	2-	2-	2	2-	2-	12+	6	0.3	1+	1	1+	2	2	2	1+	1+	11	10	15	11 13 CC
22	Q1	0+	0	1-	1-	1-	2-	1-	0+	5	3	0.0	1	0+	1+	1	1+	2+	1+	1	8	6	14	6 13 CC
23		1	3-	2-	1+	1+	2-	1+	2+	13+	6	0.3	1	2-	2-	1+	1+	2+	2-	3-	13	16	17	12 20
24		3+	4-	2	2-	1+	2	2	3-	19-	10	0.6	3-	3-	2	2-	2-	2+	2	2+	17	19	20	23 16
25		2+	2	1-	2-	2+	3-	2	2+	16	8	0.4	2-	2-	1-	2-	2+	3-	2-	2	14	17	18	15 21
26	Q9	3-	2	2-	2+	1	1-	1+	0+	12	6	0.3	2+	2-	2-	3-	2-	1	2-	1-	12	9	17	20 7 C
27	Q6	2-	1+	1+	1-	1+	1	2+	2+	12	6	0.3	1+	1	2-	1+	2-	2-	2+	2+	12	12	13	10 14 C
28		4	2+	3-	2	3+	2+	2	2-	20+	12	0.7	3	2+	2+	2+	3+	3	2+	2-	23	25	30	28 27
29	D1	2-	5-	6	5	4+	4-	3+	2	31-	32	1.3	2-	4	5	5	4	3+	3+	2+	52	45	57	70 34
30	D2	3+	6-	5	4-	5-	4-	3	2+	31+	30	1.3	3	5-	4+	4-	5-	4-	3	2+	51	38	57	60 36
31	Q4¶	2+	3-	4+	4+	4-	3+	2	2+	25	18	1.0	2	2+	4	4	3+	3+	2+	2+	31	28	33	32 29
									Mean	10	0.51										19.3	18.1	22.2	20.2

Day	Three-Hourly Indices Kn								An	Three-Hourly Indices Ks								As
	1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8	
1	0+	1-	1-	2-	2+	3	2+	2-	13	1	1+	2-	2	3-	3+	3-	2	17
2	2-	1	1+	4-	2+	2-	3-	3-	18	2	2-	2+	4-	3	2+	3+	3	26
3	1	1	1+	2	3-	2+	3-	2	15	2	3-	2	2+	3	3-	3	3	23
4	2+	3-	2-	2+	2	2	3-	3-	19	3+	3	2+	2+	2+	2	3-	2+	22
5	2-	1+	2-	2+	1+	2+	2+	2+	15	1+	2-	2	2	1+	1+	2+	2+	13
6	1+	2-	2-	0	0+	2-	0	0+	6	2-	2-	1+	0+	1+	1+	1-	1	8
7	0+	0	1	1	1+	1+	1-	1+	6	1+	1	1+	1+	1+	2-	0+	2+	10
8	2-	1+	2	1	3	4+	4	3-	26	2+	2+	3-	2-	4-	4+	5-	3	36
9	2	3-	2	3	2+	2	3-	3-	20	2+	3+	2	3	3-	3-	4	4	32
10	2-	3+	2+	2+	0+	2-	0+	1	13	3-	4-	4-	2	1+	2	1-	2	20
11	2-	1+	1-	1-	1-	2+	2-	1+	9	2+	2+	1	1+	1+	2+	2	2	14
12	3+	2-	3-	2+	5-	4-	4-	4-	38	4+	3	4-	3+	5-	4	4	4+	53
13	3-	3-	3-	3-	4	2+	1-	1	22	3	3-	3	3	3	2+	2-	2-	23
14	2-	2	1+	1+	0+	2-	2	1+	11	3-	2	1	1	1+	2-	3-	2-	13
15	1	1	1-	0+	0	0	3-	3-	9	2	2	2	1	0+	0	3+	3-	14
16	1	0+	1+	1+	0	1	2-	2-	8	2	1	2	2-	0+	1-	2+	1+	10
17	1-	0+	0	1+	1-	2+	3	4-	14	2-	1	1-	2-	1	2-	3-	3	13
18	3+	2+	3	3	3-	3+	2	2	26	3+	2	2+	3-	3-	3	3-	2+	24
19	2-	1+	1+	3	3-	3-	1+	1+	16	2	2	2	3-	2+	2+	1+	2-	16
20	1	1+	1+	1+	1+	2-	1+	2+	10	1+	2-	1	2-	1+	2-	2-	2+	11
21	1+	1-	1	2-	2	2+	2-	1+	11	1+	1+	2-	2	2	2	1+	1+	12
22	1-	0	1	1-	1	2+	1+	1-	7	1	1-	2-	1+	2-	2	1+	1+	9
23	1	2-	2-	1+	1+	2+	1+	2+	11	1+	2-	1+	1+	2-	2+	2-	3	15
24	3-	2+	2	2-	1+	3-	2	2+	17	3-	3-	2	2-	2-	2+	2	3-	18
25	2-	2-	0+	1+	2+	3-	2	2	13	1+	2	1	2-	3-	3-	2-	2	15
26	2	1+	2-	2+	2-	1	2-	0+	11	2+	2-	2-	3-	1+	1+	2-	1-	13
27	1+	1-	1+	1-	2-	1+	2	2	10	2-	1+	2-	2-	2	2	2+	3-	15
28	3	2+	2+	2+	3+	3-	2	1+	22	3	2+	2	2+	3+	3+	3-	2-	24
29	2-	4-	5	5	4	3+	3+	2+	48	2-	5-	5	5	4	4-	3+	2+	55
30	3	4	4+	3+	5-	4-	3	2	45	3+	5+	4+	4-	5	4-	3	3-	56
31	2-	2+	4+	4+	4-	3+	3-	2+	36	2	2+	3+	3+	3	3+	2	2+	26
								Mean	17.6									21.2

ERRATA:

Conversion in 1979 to a new computer with a different word size caused values of indices aa to be truncated if they exceeded 99; the machine read and printed only the two least significant digits. Correct values of the affected indices are listed below. Both half-daily values are given, too, to make clear which of the two entries should be corrected.

Date	N	S	M
21 Feb 1979			66 102
10 Mar			54 101
25 Apr	109		27 148
26 Apr			103 15
13 Aug			53 108
20 Aug			33 100
29 Aug			59 111
18 Sep			100 63
25 Jul 1980			13 100
19 Dec	118	123	63 178
06 Feb 1981			24 116

NOTE:

aa indices are provisional from 1 January 1981 until further notice, in connection with the change of the Southern Hemisphere observatory.

Quiet days (Q) and disturbed days (D), geomagnetic planetary three-hour-range indices (Kp) (integers alone are equivalent to those normally given with a small zero), magnetic character figures (Cp), and average amplitude (Ap) (unit 2 nT) prepared by Geophysikalisches Institut at the University of Göttingen, F.R. of Germany for the International Service of Geomagnetic Indices. Ten most quiet days [Q1-Q0(10)] and five most disturbed days [D1-D5] are ordered from most quiet or disturbed, respectively. A or K means "not really quiet" (A = "Ap>6", K = "Ap≤6 but one Kp>30 or two Kp values>3-"). An asterisk means "not really disturbed" (Ap<20).

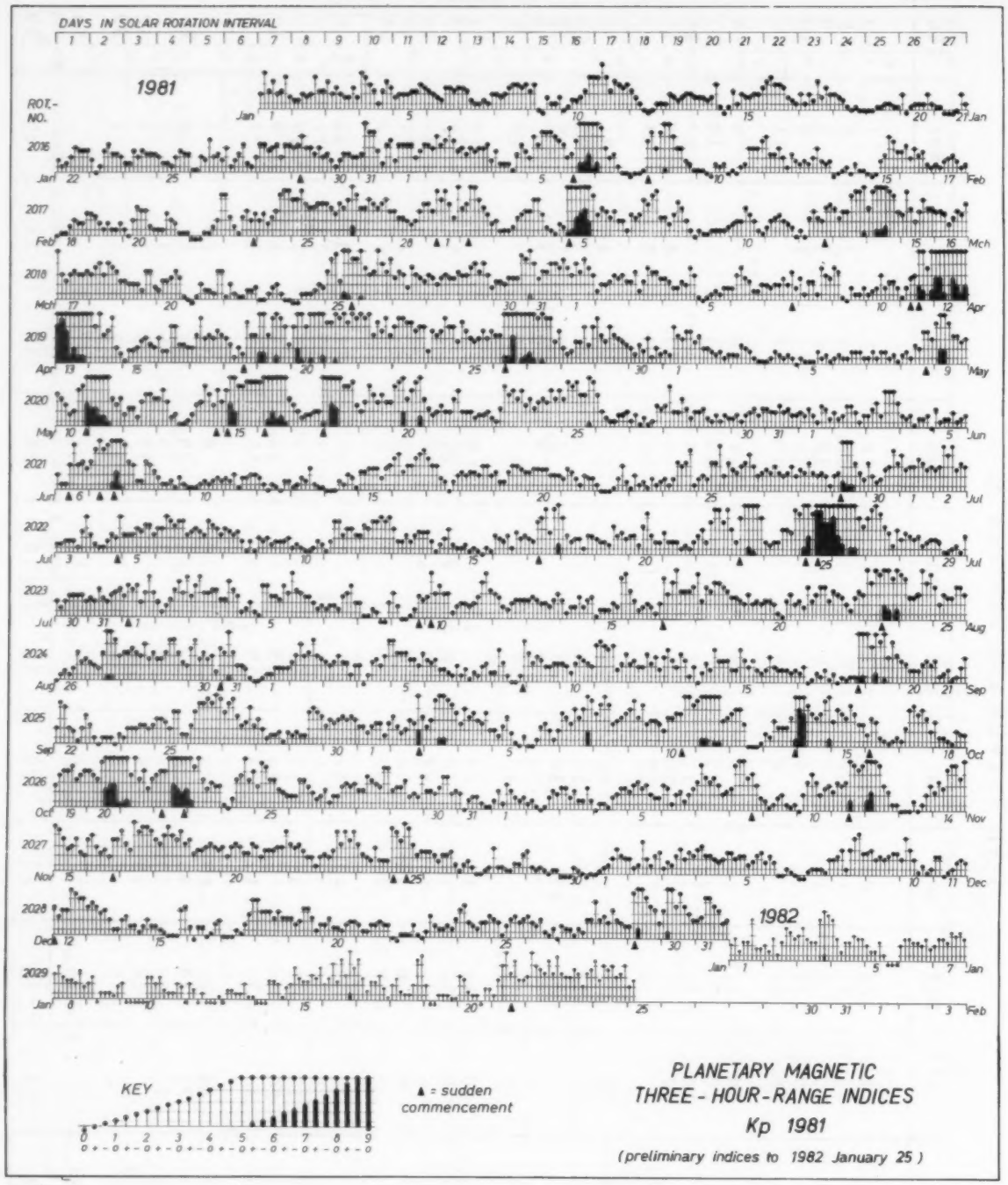
Geomagnetic three-hourly indices Km, Kn, Ks, daily mean values Am, An, As (unit 1nT), and indices aa are prepared by M. Menvielle of the Institut de Physique du Globe, Paris, France. For aa indices daily north (N) and south (S) values, and half-daily antipodal mean (M) values are given. Quiet 24-hour and 48-hour intervals centered on 1200 UT are indicated for really quiet as C and for quiet but with some slightly disturbed three-hour intervals as K. The first hundred years series of aa is in IAGA Bulletin No.33, and complementary data are in IAGA Bulletin No.39.

DAILY AVERAGE INDICES Ap

1981

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	13	14	28	23	16	7	17	18	5	9	7	6
2	9	22	25	10	7	7	22	15	18	22	5	9
3	9	13	8	14	5	16	9	18	9	36	8	8
4	14	9	12	11	4	5	9	11	11	17	6	10
5	9	25	81	4	4	6	12	15	17	7	11	9
6	9	48	11	10	5	14	19	14	8	6	9	4
7	6	20	20	9	5	50	14	10	5	32	19	3
8	11	14	10	11	11	16	8	4	10	25	27	15
9	6	22	4	8	39	4	6	7	11	21	4	10
10	9	3	8	8	32	4	4	16	9	27	13	9
11	19	10	7	39	61	6	13	15	21	46	31	6
12	4	11	11	96	13	4	20	9	10	12	39	23
13	6	7	28	121	10	5	9	9	12	17	5	12
14	6	3	45	27	18	4	7	8	10	73	27	6
15	7	10	19	8	54	11	4	13	10	20	20	6
16	12	10	14	13	59	21	8	8	7	8	17	4
17	8	6	18	19	13	10	29	25	4	18	32	7
18	4	6	19	14	57	10	10	23	18	6	26	14
19	3	6	10	45	18	10	9	10	38	23	14	10
20	4	9	9	53	43	10	12	8	9	67	13	6
21	2	5	8	41	12	7	6	14	7	33	15	6
22	9	6	4	33	6	5	24	13	13	72	11	3
23	8	12	4	31	19	5	37	56	4	27	20	6
24	8	20	4	22	18	13	13	28	7	18	9	10
25	7	24	36	19	33	15	134	16	13	18	27	8
26	8	29	28	62	8	14	78	8	32	10	9	6
27	8	21	14	43	6	10	24	25	21	10	4	6
28	16	11	12	13	12	9	8	18	6	19	6	12
29	15		18	19	6	33	5	18	14	12	4	32
30	7		16	7	6	14	9	17	15	12	1	30
31	22		26		8		12	15		4		18
MEAN	9	14	18	23	20	12	19	15	12	23	15	10

GEOMAGNETIC ACTIVITY INDICES



PRINCIPAL MAGNETIC STORMS

DECEMBER 1981

OBS. 3 letter code	GEOMAG-NETIC LATI-TUDE	COMMENCEMENT DAY	hr min (UT)	TYPE	SC - AMPLITUDES D(')	H(γ)	Z(γ)	MAXIMUM 3 HOUR - INDEX K DAY (3 HOUR PERIOD)	K	RANGES D(')	H(γ)	Z(γ)	UT END DAY	HOUR
HYB	07.6N	01	1000	..	..	..	..	02(4)	4	4	103	36	04	23
HYB	07.6N	07	2123	SC	- .1	6	0	08(6)	6	5	120	41	10	12
KGL	56.5S	07	2124	SC	2	10	--	08(2,6,7) 09(2,5)	4	--	--	--	09	18
GUA	04.0N	08	1436	..	..	..	..	08(6)	5	--	40	10	08	21
HER	33.7S	08	14--	..	..	..	..	08(5,6)	5	14	63	103	08	22
GUA	04.0N	12	0144	SC	--	47	-15	12(1)	5	--	130	20	12	10
COL	64.6N	12	0146	SC*	19	211	42	12(5)	6	194	1270	520	13	19
JAI	17.3N	12	0143	SC	- 1.2	28	- 7		-	5	156	41	13	14
SHL	14.7N	12	0143	SC	- .3	27	5		-	4	158	27	13	14
UJJ	13.5N	12	0143	SC	- 1	34	- 9		-	5	179	35	13	14
ABG	09.5N	12	0143	SC	- 1.4	29	-14	12(5)	6	6	176	39	13	14
HYB	07.6N	12	0144	SC	- 1	35	- 3	12(5)	6	5	193	27	13	19
GUA	04.0N	12	1130	..	..	..	..	12(5)	5	--	70	10	12	17
ANN	01.5N	12	0143	SC	- 2.4	55	24		-	7	207	58	13	14
TRD	01.1S	12	0143	SC	- .9	45	48		-	5	230	134	13	14
PMG	18.6S	12	0144	SC*	.4*	46	40	12(1,5)	5	10	170	100	13	16
HER	33.7S	12	0144	SC	3	32	28	12(5)	5	25	140	131	13	00
GNA	43.2S	12	0144	SC*	- 2	30	*- 7	12(1,5)	5	21	90	140	13	17
KGL	56.5S	12	0145	SC	4	-21	-10	12(5,6,7)	5	--	--	--	13	16
HYB	07.6N	16	1700	..	..	..	..	16(7) 17(6,7,8) 18(1,2) 19(4,6)	3	2	100	33	19	19
HYB	07.6N	27	1200	..	..	..	..	28(5)	4	4	97	29	29	02
FRD	49.6N	29	03--	..	..	..	..	29(3,4) 30(2,5)	5	22	110	54	31	--
COL	64.6N	29	0456	SC*	7	102	21	29(3,4) 30(5)	7	283	1850	890	31	23
SIT	60.0N	29	0457	SC*	5 *	--	--	29(4) 31(3,4)	7	--	--	650	30	19
JAI	17.3N	29	0455	SC	- 1.3	41	-10		-	4	181	30	30	20
SHL	14.7N	29	0455	SC	.2	33	8		-	4	171	44	30	20
UJJ	13.5N	29	0455	SC	- .7	50	- 7		-	4	192	31	30	20
ABG	09.5N	29	0455	SC	- 1.2	42	-12	29(3)	6	5	187	38	30	20
HYB	07.6N	29	0456	SC	- .7	47	- 5	29(4)	6	5	206	27	31	23
GUA	04.0N	29	0455	SC	--	41	-13	29(3)	5	--	190	40	29	19
ANN	01.5N	29	0455	SC	- 2.6	80	25		-	5	241	80	30	20
TRD	01.1S	29	0455	SC	- .3	84	90		-	5	256	193	30	20
PMG	18.6S	29	0455	SC*	1.4*	58	* 46	* 29(2,3) 30(3,5)	5	13	190	100	30	19
HER	33.7S	29	0455	SC	1	29	11	29(3) 30(2)	5	27	146	106	30	21
GNA	43.2S	29	0454	SC*	1.8*	44	* 19	* 29(3,4)	5	17	100	190	29	23
KGL	56.5S	29	0455	SC	- 7	27	23	30(5)	7	--	--	--	30	24
GUA	04.0N	30	0043	..	..	..	..	30(2)	5	--	170	40	30	20
GNA	43.2S	30	02..	..	..	..	..	30(2,5)	5	17	70	140	30	23

REPORTS WERE RECEIVED FROM THE FOLLOWING OBSERVATORIES:

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KERGUELEN PORT MORESBY SHILLONG SITKA TRIVANDRUM UJJAIN

SUDDEN COMMENCEMENTS AND SOLAR FLARE EFFECTS

DECEMBER 1981

PRELIMINARY REPORT ON RAPID MAGNETIC VARIATIONS

The meaning of the station symbols is given in the IAGA-Bulletin nr. 32h, page 106-116. Times of ssc are mean values.

Sudden commencements followed by a magnetic storm or a period of storminess (ssc)

07 2126 A: MPO; B: GNA; C: WNG CZT KGL DUM (cr: TOL - sfe: BNG)

12 0144 A: VIC HTY LNP MPO; B: WNG DOU HRB MMB AQU KAK BNG GNA KGL; C: VAL NGK CLF EBR KNY CZT (bps: B: TOL)

29 0455 A: DOU VIC HTY LNP BNG MPO DUM; B: SOD WNG HRB MMB AQU TOL KAK KNY GNA CZT KGL; C: VAL NGK CLF EBR

31 0207 A: MPO; B: HRB BNG; C: KNY LNP

Solar-flare effects (sfe)

Effects confirmed by ionospheric or solar observations are underlined.

01 0102 - 0120 KNY

01 0841 - .... BNG (ssc: C: TOL)

02 1108 - 1205 TOL

10 0605 - .... BNG

10 1052 - 1110 TOL

26 0702 - .... BNG

27 0053 - 0110 MMB

29 0031 - 0040 MMB

RADIO PROPAGATION QUALITY INDICES

DECEMBER 1981

DAY	TOKYO	NEW YORK	TEHERAN	OSLO	BRACKNELL
1	5.0	6.7	5.9	5.2	6.3
2	5.0	4.7	5.5	4.7	4.7
3	6.0	6.8	4.5	5.9	5.4
4	6.1	6.5	2.9	6.3	6.1
5	6.8	6.2	5.0	6.3	6.5
6	6.2	4.6	5.4	4.8	6.7
7	6.2	5.1	4.4	4.9	6.4
8	6.2	5.9	5.8	7.8	8.2
9	6.2	6.7	6.3	6.1	6.8
10	5.2	7.0	3.6	5.0	4.8
11	5.6	7.1	6.3	6.5	7.0
12	7.0	6.7	7.1	7.4	9.3
13	7.1	7.7	7.1	6.3	8.0
14	5.3	7.3	5.4	5.3	4.9
15	5.0	5.6	4.7	4.7	4.7
16	3.7	5.2	3.7	5.1	4.0
17	4.5	5.2	1.4	5.7	2.0
18	4.2	5.9	3.1	5.4	4.1
19	3.9	6.9	3.9	3.8	2.2
20	3.9	6.8	2.9	3.5	4.3
21	4.0	6.7	0.0	3.9	4.4
22	4.1	6.6	0.4	4.9	1.7
23	6.1	6.2	2.3	6.9	7.1
24	6.1	6.2	1.7	5.5	4.0
25	4.8	6.5	2.9	4.5	4.0
26	3.4	6.8	0.0	3.2	2.3
27	5.1	6.4	0.0	6.2	5.0
28	4.8	6.7	5.1	4.5	4.3
29	4.2	6.1	7.5	5.5	6.1
30	5.9	5.7	6.8	5.6	4.1
31	5.3	5.1	3.5	5.0	3.1
MEAN	5.3	6.2	4.0	5.4	5.1

CALCULATION OF QUALITY INDICES (Q)

From all 24 hourly field strength values and from all frequencies of the same circuit a median field strength value is calculated (FD). This daily value is compared with the average value (FA) of the preceeding 27 days (1 sun rotation).

$$Q = 6.0 + 20 \log(FD/FA)/3.0$$

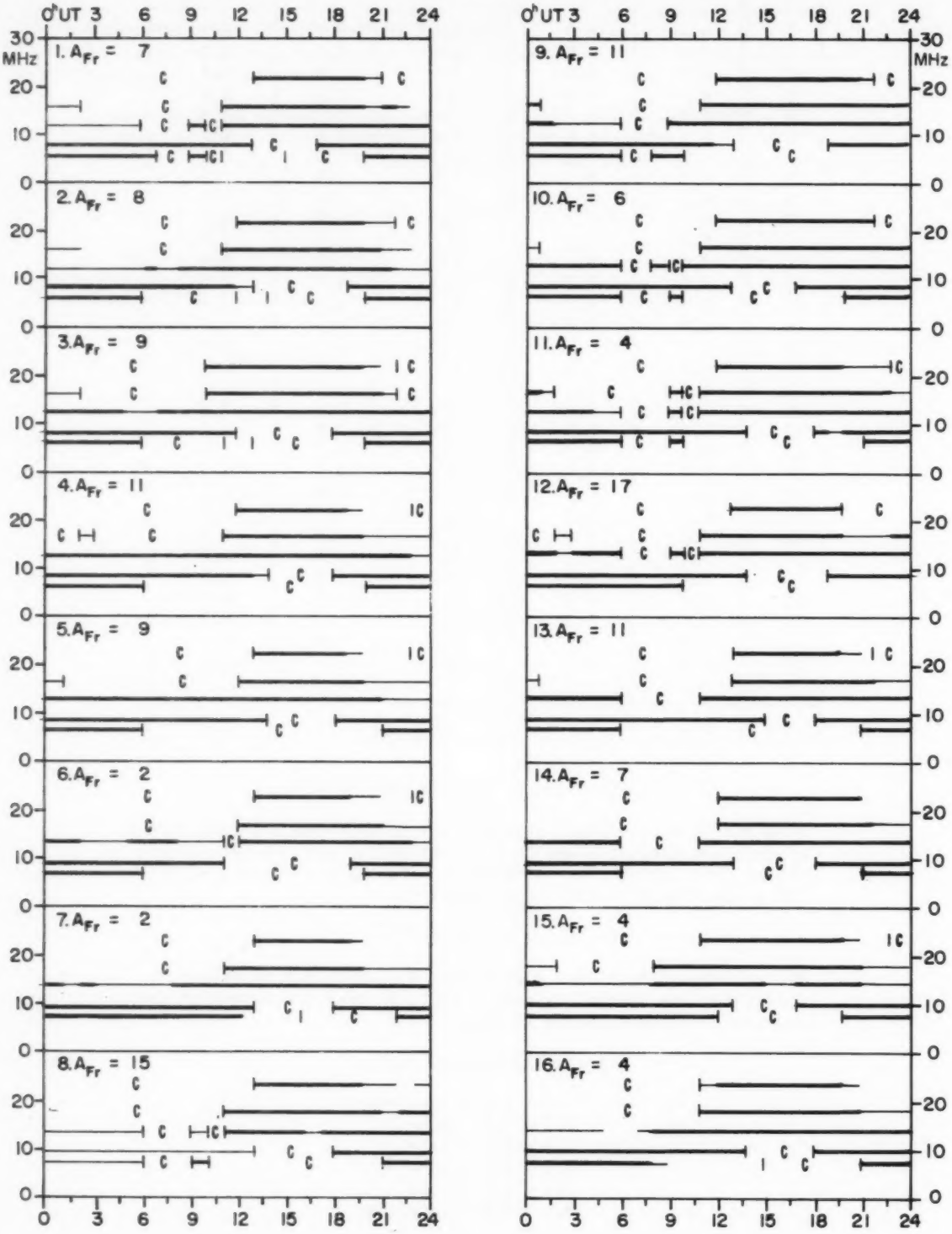
The quality indices vary from 0.0 to 9.9 where 6.0 is normal. Conditions are "normal" (index = 6.0), if they correspond to the average of the preceeding 27 days.

Scale for Quality Indices

0.0 - 1.0 = very poor
1.1 - 3.0 = poor
3.1 - 5.0 = fair
5.1 - 7.0 - normal
7.1 - 9.0 = good
9.1 - 9.9 = very good

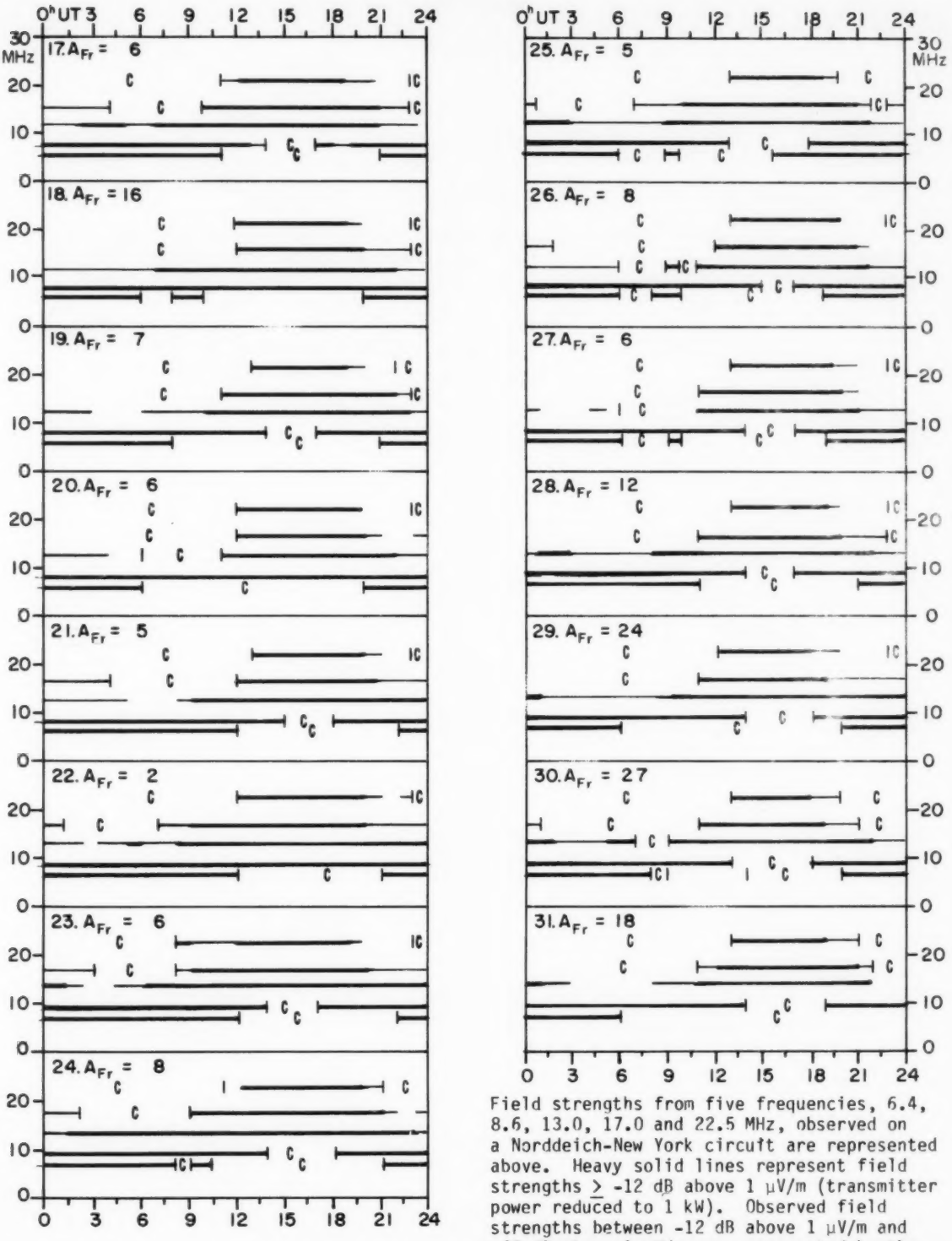
TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

DECEMBER 1981



TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

DECEMBER 1981



Field strengths from five frequencies, 6.4, 8.6, 13.0, 17.0 and 22.5 MHz, observed on a Norddeich-New York circuit are represented above. Heavy solid lines represent field strengths $\geq$ -12 dB above 1 μV/m (transmitter power reduced to 1 kW). Observed field strengths between -12 dB above 1 μV/m and -40 dB above 1 μV/m are represented by the fine line.

SGD 450 Part I (Prompt)

LATE DATA

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PIONEER XII (VENUS ORBITER)

Interplanetary Magnetic Field Magnitudes

MAGNETIC FIELD MAGNITUDES

OCTOBER 1981

DATE	TIME	BMAG
10/01/81	13:55:00	9.20
10/02/81	13:55:00	17.50
10/03/81	13:55:00	12.60
10/04/81	13:55:00	14.80
10/05/81	13:55:00	12.30
10/06/81	13:50:00	14.70
10/07/81	13:50:00	13.80
10/08/81	13:50:00	13.70
10/09/81	13:50:00	17.30
10/10/81	13:50:00	15.30
10/11/81	13:50:00	34.80
10/12/81	13:50:00	19.00
10/13/81	13:50:00	10.00
10/14/81	18:20:00	12.00
10/15/81	13:50:00	12.50
10/16/81	13:50:00	13.70
10/17/81	13:50:00	14.00
10/18/81	13:50:00	9.00
10/19/81	15:20:00	19.00
10/20/81	13:50:00	11.60
10/21/81	13:50:00	24.50
10/22/81	13:50:00	18.00
10/23/81	13:50:00	12.50
10/24/81	13:50:00	11.00
10/25/81	13:50:00	9.50
10/26/81	14:50:00	10.00
10/27/81	13:50:00	11.80
10/28/81	13:50:00	30.50
10/29/81	13:50:00	10.50
10/30/81	13:50:00	12.30
10/31/81	13:50:00	11.80

COSMIC RAY INDICES

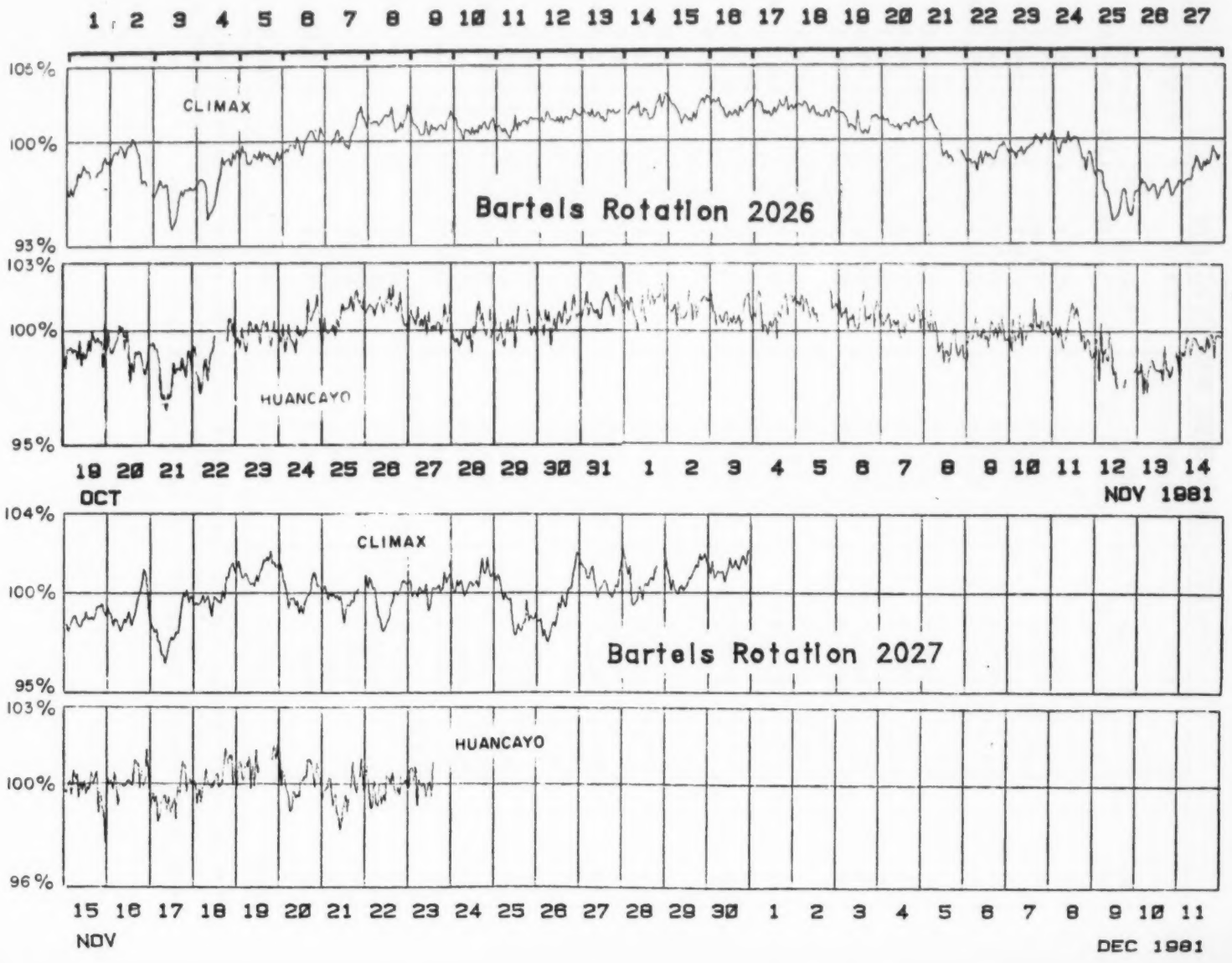
(Neutron Monitors)

NOVEMBER 1981

Nov 1981	KIEL Average (cts/h)/100	CLIMAX Average (cts/h)/100	TOKYO Average (cts/h)/100	HUANCAYO Average (cts/h)/100
1	5637.2	3644.6	3548.7	1726.3
2	5623.2	3642.1	3526.0	1723.6
3	5638.7	3645.4	3530.2	1718.5
4	5629.9	3646.4	3530.2	1719.7
5	5631.3	3640.0	3535.1	1723.9(38)
6	5609.9	3610.5	3517.6	1718.7
7	5599.3	3607.3	3517.8	1714.4
8	5518.1	3562.8	3504.1	1698.3
9	5543.7	3529.7	3508.5	1703.8
10	5575.9	3554.7	3520.8	1708.0
11	5546.2	3545.5	3516.1	1704.7
12	5392.4	3426.6	3465.7	1681.7(36)
13	5387.9	3452.1	3474.4	1676.7
14	5488.3	3502.1	3502.3	1695.4
15	5523.6	3544.2	3498.1	1699.8
16	5562.1	3558.7	3508.8	1706.8
17	5528.1	3527.6	3506.1	1696.6
18	5550.1	3588.0	3527.0	1708.0
19	5610.3	3629.8	3533.7	1716.0(36)
20	5567.3	3591.3	3508.7	1706.0
21	5533.5	3579.0	3508.4	1698.0
22	5511.8	3578.5	3515.1	1701.1
23	5556.0	3596.5	3513.2	1705.4(30)
24	5598.9	3611.8	3530.6	---
25	5519.6	3561.4	3496.0	---
26	5545.0	3563.9	3494.8	---
27	5578.6	3611.5	3515.5	---
28	5632.3	3613.0	3528.8	---
29	5639.7	3621.6	3526.1	---
30	5650.7	3638.0	3532.5	1719.5(4)
MEAN	5564.3	3580.9	3514.7	1706.6

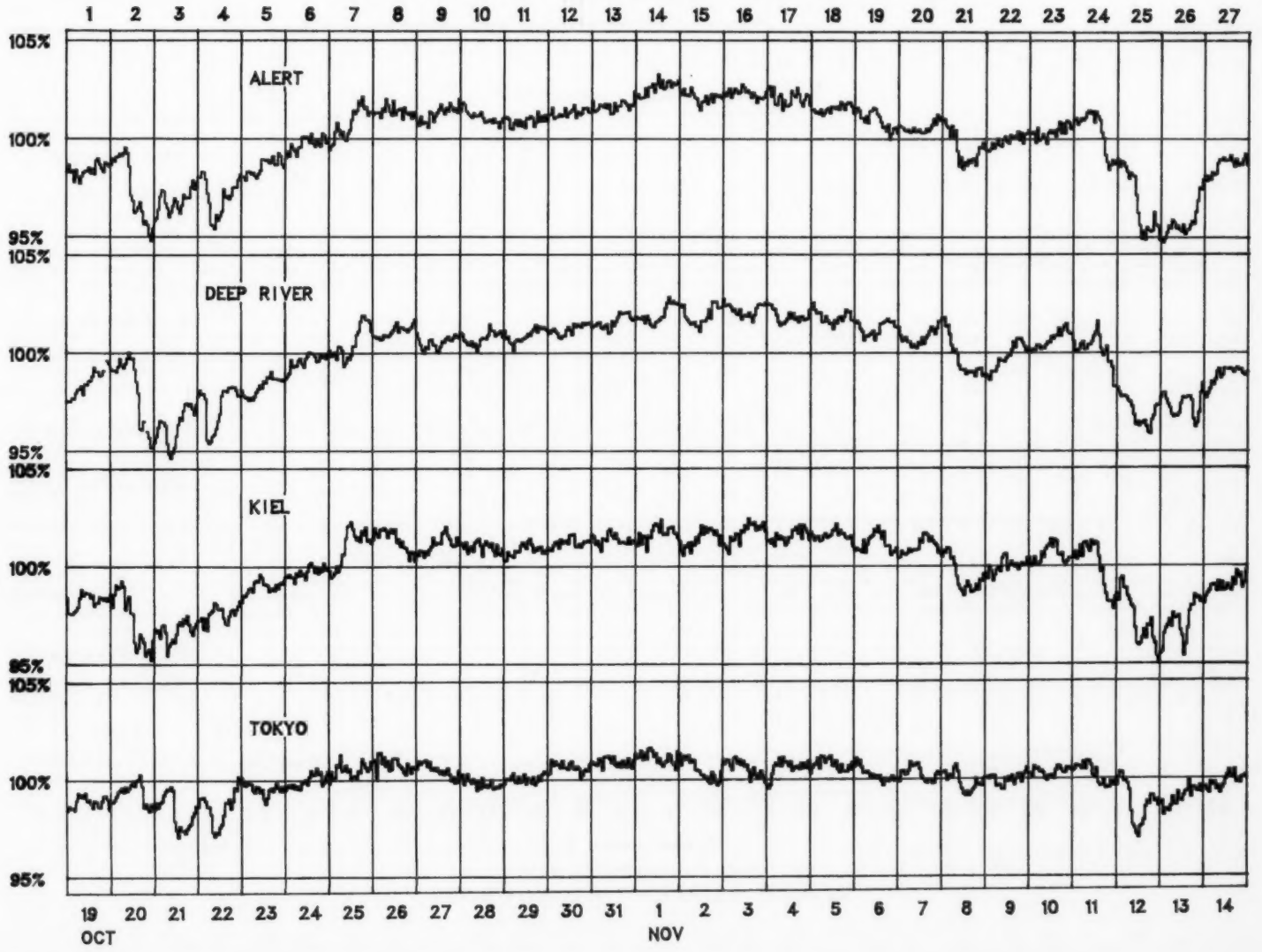
For less than 24-hour coverage, parentheses enclose the number of hours for which data are available. For Climax and Huancayo, parentheses enclose the number of section hours whenever the sum of both sections falls below 40 hours.

COSMIC RAY INDICES
(Neutron Monitor)



COSMIC RAY INDICES
(Neutron Monitor)

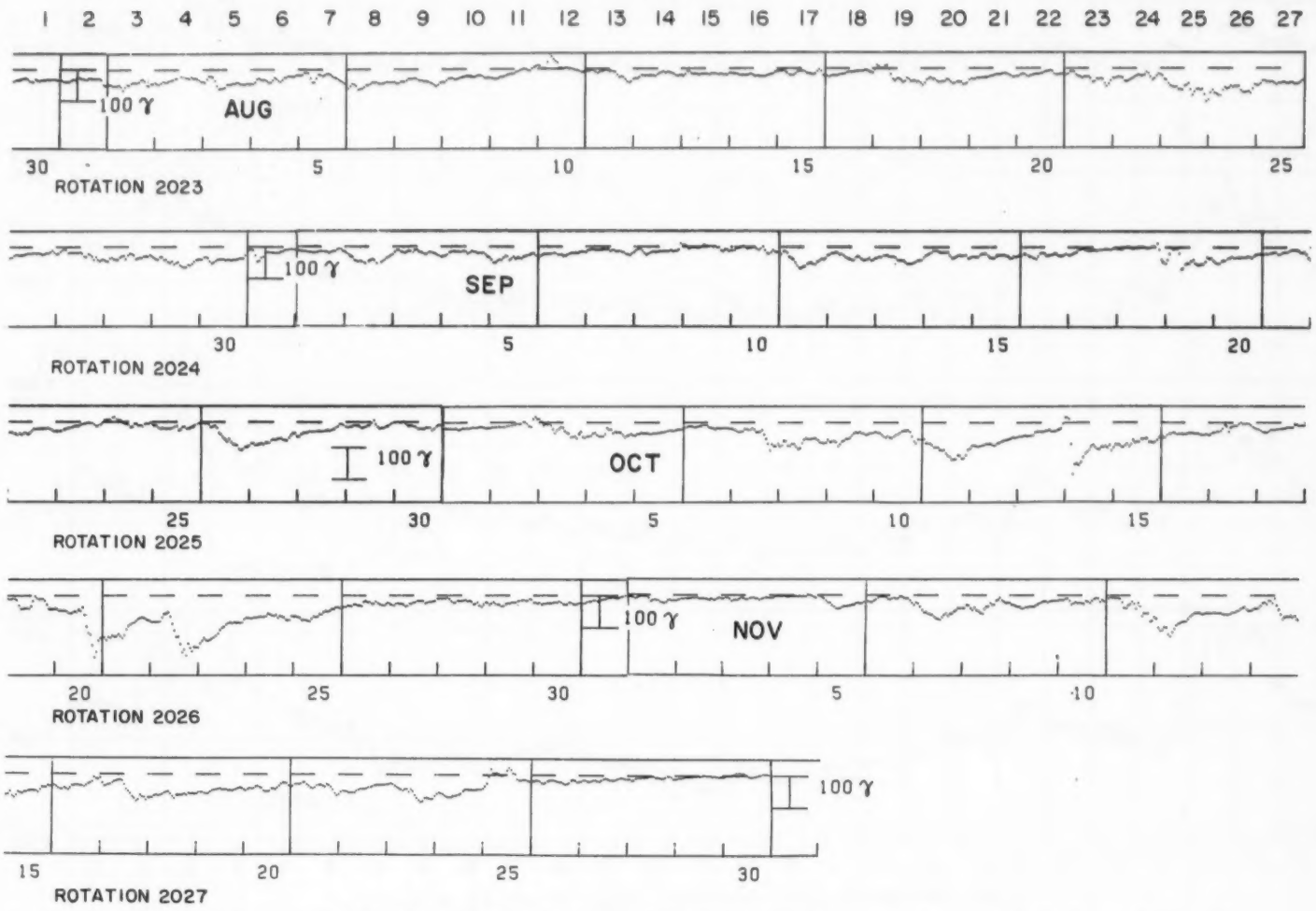
Bartels Rotation 2026 (October 1981–November 1981)



GEOMAGNETIC ACTIVITY INDICES

Hourly Equatorial Dst

by Bartels Rotation



Note: Both the sensitivity indicator placed on the last day of the month and the zero reference level change from month to month.

HOURLY EQUATORIAL Dst VALUES (PROVISIONAL)

NASA/GODDARD SPACE FLIGHT CENTER

NOVEMBER 1981

(Time-UT)

(Units-Gammas)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	-6	-7	-9	-12	-10	-6	-3	-5	-4	-4	-10	-20	-16	-14	-16	-17	-22	-24	-25	-22	-16	-14	-17	-17
2	-17	-15	-13	-11	-12	-10	-10	-10	-9	-8	-9	-8	-11	-11	-11	-12	-13	-14	-11	-14	-14	-10	-8	-11
3	-11	-7	-8	-12	-18	-15	-14	-14	-11	-7	-10	-13	-13	-10	-9	-8	-11	-11	-15	-12	-10	-8	-8	-9
4	-9	-9	-4	-2	-4	-3	-2	-4	-6	-4	-4	-4	-3	-5	-3	-5	-3	-5	1	0	-2	-6	-5	-1
5	-3	-7	-11	-17	-23	-24	-31	-36	-41	-42	-40	-37	-34	-35	-33	-32	-30	-29	-25	-23	-26	-25	-21	-16
6	-19	-21	-22	-17	-13	-9	-5	-4	-5	-6	-12	-13	-10	-9	-11	-10	-4	-4	-9	-10	-10	-16	-24	-30
7	-23	-26	-36	-46	-54	-54	-58	-60	-62	-67	-72	-74	-77	-69	-62	-58	-65	-59	-57	-51	-47	-40	-40	-39
8	-40	-31	-32	-40	-46	-39	-47	-50	-56	-58	-43	-37	-35	-25	-30	-30	-17	-14	-8	-16	-20	-24	-23	-24
9	-29	-31	-33	-36	-37	-40	-39	-37	-38	-35	-36	-36	-32	-28	-25	-22	-19	-18	-22	-19	-17	-16	-17	-16
10	-14	-14	-15	-11	-10	-17	-28	-25	-21	-25	-24	-25	-27	-18	-19	-24	-17	-12	-9	-10	-20	-14	-16	-19
11	-10	-7	-7	-7	-8	-9	-11	-21	-38	-39	-30	-27	-19	-26	-41	-23	-34	-64	-55	-55	-56	-82	-78	-67
12	-72	-101	-110	-108	-100	-100	-121	-128	-114	-104	-93	-88	-86	-82	-82	-81	-73	-66	-61	-56	-55	-54	-56	-59
13	-57	-55	-55	-56	-55	-54	-56	-55	-55	-58	-60	-60	-60	-57	-53	-53	-50	-47	-42	-38	-36	-44	-46	-46
14	-44	-41	-41	-38	-32	-24	-22	-27	-16	-17	-24	-10	-31	-45	-60	-75	-68	-66	-67	-63	-68	-64	-74	-77
15	-65	-63	-56	-69	-74	-67	-57	-60	-62	-57	-56	-53	-52	-51	-53	-53	-58	-49	-41	-41	-41	-37	-38	-37
16	-35	-38	-44	-47	-47	-42	-46	-49	-43	-36	-35	-34	-35	-36	-37	-39	-35	-30	-27	-23	-10	-14	-15	-11
17	-28	-37	-35	-32	-31	-27	-22	-20	-18	-17	-20	-32	-46	-53	-60	-69	-75	-84	-79	-64	-70	-71	-80	-74
18	-72	-71	-66	-63	-66	-64	-62	-58	-55	-54	-61	-68	-75	-64	-63	-64	-63	-61	-64	-59	-61	-59	-61	-60
19	-56	-55	-55	-59	-60	-59	-54	-50	-48	-47	-45	-44	-48	-47	-46	-50	-49	-51	-48	-46	-43	-40	-43	-47
20	-51	-46	-43	-44	-44	-38	-37	-40	-43	-51	-54	-54	-52	-44	-44	-47	-41	-36	-30	-26	-27	-28	-35	-38
21	-36	-31	-30	-31	-29	-26	-24	-31	-36	-41	-44	-40	-35	-33	-32	-36	-38	-31	-34	-38	-47	-59	-65	-62
22	-55	-51	-53	-54	-57	-57	-57	-57	-51	-48	-45	-44	-44	-43	-39	-39	-37	-34	-33	-33	-33	-32	-32	-31
23	-30	-28	-30	-35	-39	-43	-46	-50	-45	-44	-54	-46	-52	-63	-72	-80	-86	-83	-73	-72	-74	-76	-75	-66
24	-60	-56	-58	-61	-65	-69	-70	-70	-67	-65	-63	-62	-59	-51	-46	-46	-47	-46	-48	-47	-46	-45	-46	-42
25	-36	-27	-5	18	6	5	6	3	-3	-2	0	13	22	15	5	2	-13	-17	-16	-15	-14	-18	-20	-22
26	-18	-17	-17	-19	-25	-27	-24	-19	-17	-16	-16	-18	-20	-22	-22	-26	-29	-27	-24	-16	-13	-16	-22	-20
27	-19	-15	-15	-18	-20	-18	-15	-16	-18	-19	-15	-12	-10	-12	-14	-15	-16	-13	-11	-9	-8	-10	-12	-14
28	-12	-16	-14	-9	-7	-7	-6	-6	-6	-5	-2	-2	-3	-7	-7	-8	-10	-9	-6	-2	-2	-6	-12	-14
29	-10	-8	-9	-7	-4	-4	-4	-3	-3	-3	-2	-3	-3	-1	0	-2	-2	-2	-4	-3	-5	-6	-5	-5
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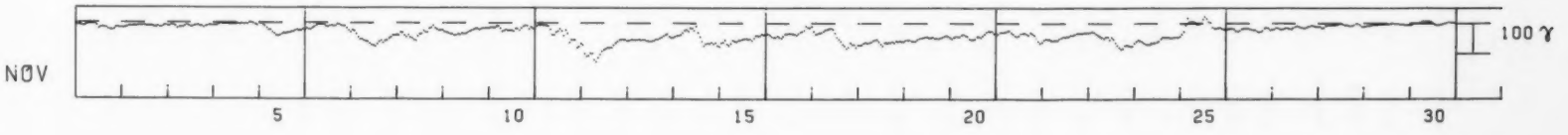

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